Nuclear Data Sheets for A = 182^{*}

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Abstract: Nuclear spectroscopic information for known nuclides of mass number 182 (Yb, Lu, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb) with Z=70 to 82 and N=112 to 100 have been evaluated and presented together with adopted energies and $J\pi$ of levels in these nuclei. No excited state data are yet available for ^{182}Y and ^{182}Lu , while only limited structure information is available for ^{182}Pb and ^{182}Tl . Rotational band structures are known for ^{182}Hg and ^{182}Au but spin-parity assignments remain largely tentative. The decays of ^{182}Lu , ^{182}Hg , ^{182}Au and ^{182}Tl are not well established. The ^{182}Hf isotope is of geophysical and astrophysical interest.

This evaluation supersedes previous full evaluations of A=182 published by 2010Si13, 1988Fi05 and 1975Sc13, and a selected (mainly high-spin) update of A=182 published by 1995Si04.

Only the Adopted properties of levels and gamma rays are presented in NDS, consult the ENSDF database at www.nndc.bnl.gov/ensdf/ for details of individual reaction and decay datasets.

Cutoff Date: Literature available up to July 15, 2015 has been consulted.

General Policies and Organization of Material: see <http://www.nndc.bnl.gov/nds/NDSPolicies.pdf>.

General Comments: The statistical analysis of γ -ray data and deduced level schemes is carried out through computer codes available at NNDC, BNL website: www.nndc.bnl.gov. The direct feedings to excited states in β^- and ϵ decays have generally been computed from $I(\gamma+ce)$ intensity balances at each level; the associated $\log ft$ values are calculated using $\log ft$ code. The total internal conversion coefficients corresponding to assigned multipolarities and mixing ratios are theoretical values calculated using BrIcc code (2008Ki07). A general 1.4% uncertainty is assumed in quoted theoretical internal conversion coefficients. All Q values have been adopted from 2012Wa38. The static magnetic and quadrupole moments are from 2014StZZ compilation and 2013StZZ evaluation of quadrupole moments. Relevant data for A=186 isotopes which decay by α decay to A=182 isotopes have been taken primarily from A=186 Nuclear Data Sheets (2003Ba44), but updated when needed

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NUCLEAR DATA SHEETS

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Nuclide	Level	J^{π}	$T_{1/2}$	Decay Modes
^{182}Yb	0.0	0+	>160 ns	β^- =?
^{182}Lu	0.0		2.0 min 2	β^- =100
^{182}Hf	0.0	0+	8.90 $\times 10^6$ y 9	β^- =100
	1172.87	(8-)	61.5 min 15	β^- =54 2; %IT=46 2
	2571.3	(13+)	40 μs 10	%IT=100
^{182}Ta	0.0	3-	114.74 d 12	β^- =100
	16.273	5+	283 ms 3	%IT=100
	519.577	10-	15.84 min 10	%IT=100
^{182}W	0.0	0+	stable	
	2230.65	(10+)	1.3 μs 1	%IT=100
^{182}Re	0.0	7+	64.2 h 5	ϵ + β^+ =100
	0.0+x	2+	14.14 h 45	ϵ + β^+ =100
^{182}Os	0.0	0+	21.84 h 20	% ϵ =100
	1831.4	(8)-	0.78 ms 7	%IT=100
^{182}Ir	0.0	3+	15.0 min 10	ϵ + β^+ =100
^{182}Pt	0.0	0+	2.67 min 12	ϵ + β^+ =99.962 2; % α =0.038 2
^{182}Au	0.0	(2+)	15.5 s 4	ϵ + β^+ =99.87 5; % α =0.13 5
^{182}Hg	0.0	0+	10.83 s 6	ϵ + β^+ =86.2 9; % α =13.8 9
^{182}Tl	0.0	(7+)	3.1 s 10	ϵ + β^+ =97.5 25; % α <5
^{182}Pb	0.0	0+	55 ms 5	% α =98; % ϵ + β^+ =2
^{183}Hg	0.0	1/2-	9.4 s 7	% ϵ p=2.6 $\times 10^{-4}$ 6; ...
^{186}Os	0.0	0+	2.0 $\times 10^{15}$ y 11	% α =100
^{186}Pt	0.0	0+	2.08 h 5	% α =0.000140; ...
^{186}Au	0.0	3-	10.7 min 5	% α =8 $\times 10^{-4}$ 2; ...
^{186}Hg	0.0	0+	1.38 min 6	% α =1.6 $\times 10^{-2}$ 5; ...
^{186}Tl	0+x	(7+)	27.5 s 10	% α =0.00600; ...
^{186}Pb	0.0	0+	4.82 s 3	% α =40 8; ...
^{186}Bi	0.0	(3+)	14.8 ms 8	% α =96.0; ...
	0+x	(10-)	9.8 ms 4	% α =96.0; ...
^{186}Po	0.0	0+	28 μs +16-6	% α =100

Adopted Levels

$Q(\beta^-)=2580$ CA; $S(n)=6080$ CA; $S(p)=10860$ CA; $Q(\alpha)=-1210$ CA 1997Mo25.

$S(2n)=10630$, $S(2p)=20050$ (1997Mo25, theory).

2012Ku26: ^{182}Yb produced and identified in $^9\text{Be}(^{238}\text{U},\text{F})$, $E=1$ GeV/nucleon reaction using SIS-18 synchrotron facility at GSI. Target= 1.6 g/cm^2 ^9Be placed at the entrance of projectile Fragment Separator (FRS). Particle identification was achieved by event-by-event in-flight analysis of time-of-flight, energy loss measurement, and magnetic rigidity ($\text{tof}-\Delta E'-B\rho$). Time-of-flight measured using two plastic scintillation detectors, energy loss or deposit by ionization chambers (MUSIC), and magnetic rigidity by four time-projection chambers (TPC), which also provided energy deposit information. Isomer tagging method for known μs isomers was used to verify event-by-event identification and in-flight separation of new isotopes. Gamma rays from the known isomers were recorded in coincidence with the incoming ions using either the RISING array of Ge detectors at GSI or only two Ge detectors, a stopper foil and a scintillator for veto signal. Measured production cross section. Comparison of measured σ with predictions from ABRABLA model and EPAX-3 model. See also 2014Ku02 where ^{182}Yb was produced in $^9\text{Be}(^{208}\text{Pb},\text{X})$, $E=1$ GeV/nucleon reaction and production σ measured.

Nuclear structure calculations: 2011No15, 2008Sa21, 2005St32, 1997Lo07, 1996La03, 1995Ch37, 1995Pa06, 1987Av08, 1986Du05, 1985He14, 1984Sa16, 1981Na11, 1979Ne08.

 ^{182}Yb Levels

E(level)	$J\pi$	$T_{1/2}$	Comments
0 . 0	0+	>160 ns	$\% \beta^- = ?$ Only β^- decay mode is expected. E(level): the observed ^{182}Yb fragments assumed to correspond to the g.s. $T_{1/2}$: limiting value from time-of-flight of 160 ns in 2012Ku26. Actual β^--decay half-life is expected to be much longer as suggested by >100 s from theoretical calculations (1997Mo25). Production $\sigma=0.45$ nb 10 (2012Ku26).

Adopted Levels

$Q(\beta^-)=4170$ SY; $S(n)=5150$ SY; $S(p)=8080$ SY; $Q(\alpha)=-190$ SY 2012Wa38.

Estimated uncertainties (2012Wa38): 200 for $Q(\beta^-)$, 250 for $S(n)$, 360 for $S(p)$, 450 for $Q(\alpha)$.

$S(2n)=11340$ 210 (syst,2012Wa38), $S(2p)=18170$ (theoretical,1997Mo25).

^{182}Lu isotope produced and identified by 1982Ki04 at GSI facility using reactions: $W(^{136}\text{Xe},X)$ and $Ta(^{136}\text{Xe},X)$ $E=9$ MeV/nucleon, followed by mass separation. Measured $T_{1/2}$, γ and β radiations from ^{182}Lu decay to ^{182}Hf .

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 ^{182}Lu Levels

E(level)	$T_{1/2}$	Comments
0.0	2.0 min 2	$\% \beta^- = 100$. E(level): the 2.0-min activity is assumed to belong to the g.s. $T_{1/2}$: from timing of β rays, K x ray, and two γ rays (1982Ki04). $J\pi$: ≤ 4 from possible β feeding of 2+ state in ^{182}Hf . Shell model configuration (for spherical case): $\pi h_{11/2} \nu i_{13/2}$ suggests negative parity; 1- suggested from systematics (2012Au07).

Adopted Levels, Gammas

$Q(\beta^-)=381\text{ }6$; $S(n)=6718\text{ }6$; $S(p)=8540\text{ }160$; $Q(\alpha)=1217\text{ }12$ 2012Wa38.

$S(2n)=12413\text{ }6$, $S(2p)=16030\text{ }300$ (syst) (2012Wa38).

First identifications of ^{182}Hf : 1961Ar07, 1961Hu01, 1961Na03, 1961Wi09.

^{182}Hf produced in $^{180}\text{Hf}(2n,\gamma)$ (1961Ar07,1961Hu01,1961Na03, 1961Wi09,1971He13).

Structure calculations: 2012Ze02, 2011Li26, 2011No15, 2009Ef01, 2009Ro20, 2008Sa21, 2001Oi03, 2000Xu03.

^{186}W could, in principle, undergo α decay to ^{182}Hf . Recent studies by 2004Co26, 2003Bi13, 2003Da05, 2003Ce01 and

1997Ge15 have established upper limit for $T_{1/2}(\alpha)$ for ^{186}W as $\geq 8.2 \times 10^{21}\text{ }y$ (2004Co26) with 90% confidence limit.

 ^{182}Hf Levels**Cross Reference (XREF) Flags**

A ^{182}Lu β^- Decay (2.0 min)

B ^{182}Hf IT Decay (61.5 min)

C $^{180}\text{Hf}(t,p)$

D $^{180}\text{Hf}(^{136}\text{Xe},^{134}\text{Xe}\gamma)$

E $^{180}\text{Hf}(^{238}\text{U},^{236}\text{U}\gamma)$

E(level) [†]	J π	XREF	T _{1/2}	Comments
0.0 [#]	0+ [‡]	ABCDE	8.90×10 ⁶ y 9	% β^- =100. T _{1/2} : from 2004Vo16 (also 2005Vo17,specific activity technique using two independent methods). Others: 9×10 ⁶ y 2 (1961Wi09), 8.5×10 ⁶ y (1961Hu01), 8.0×10 ⁶ y 5 (1961Na03), 1961Ar07. ($\langle r^2 \rangle$) ^{1/2} (rms charge radius)=5.3516 fm 36 (2013An02,evaluation). $\Delta\langle r^2 \rangle(^{182}\text{Hf}-^{180}\text{Hf})=0.048\text{ }fm^2\text{ }4$ (1994An14,1994An09).
97.79 [#] 9	2+ [‡]	ABCDE		
322.17 [#] 14	(4+) [‡]	ABCDE		
666.27 [#] 17	(6+) [‡]	BCDE		
818.4 3	(1,2+)	A C		J π : γ to 0+.
905.9? 5		A		J π : γ to 2+.
1022 3		C		
1034 3	(0+)	C		J π : L(t,p)=(0).
1122.07 [#] 18	(8+) [‡]	B DE		
1172.87@ 18	(8-) [§]	B DE	61.5 min 15	% β^- =54 2; %IT=46 2. J π : systematics, probable configuration= $\pi 7/2[404] \otimes \pi 9/2[514]$; K π =8- (1974Wa14,1999Da09). Theoretical calculations (2000Xu03) predict 8- isomer in ^{182}Hf . T _{1/2} : from 1974Wa14. Others: 65 min 5, 68 min 4 (1971Wa09). 2006Av01: cross section measurement in $^{186}\text{W}(n,n'\alpha)$ at 14.72-14.88 MeV. J π : L(t,p)=(0).
1265 3	(0+)	C		
1419.5@ 5	(9-) [§]	DE		
1465		C		
1497 3		C		
≈1590		C		
1680.3 [#] 6	(10+) [‡]	D		
1691.9@ 5	(10-) [§]	DE		
1724 5		C		
1829 5		C		
1885 5		C		
1915 5		C		
1988.4@ 5	(11-) [§]	DE		
2214 5		C		
2280 5		C		
2307.3@ 6	(12-) [§]	DE		
2331.7 [#] 8	(12+) [‡]	D		
2571.3 12	(13+)	E	40 μs 10	%IT=100. T _{1/2} : from $\gamma(t)$ in $^{180}\text{Hf}(^{238}\text{U},^{236}\text{U}\gamma)$ (1999Da09). J π : Configuration=($\nu 11/2[615] \otimes \nu 1/2[510]$)(π^2_{8-}); K π =(13+). Theoretical calculations (2001Oi03,2000Xu03) predict 13+ isomer in ^{182}Hf .
2649.3@ 6	(13-) [§]	D		
3010.0@ 7	(14-) [§]	D		
3065.3 [#] 9	(14+) [‡]	D		
3869.2 [#] 11	(16+) [‡]	D		
4733.9 [#] 12	(18+) [‡]	D		

[†] From least-squares fit to E γ data for levels populated in γ -ray datasets, others are from (t,p).

Adopted Levels, Gammas (continued) ^{182}Hf Levels (continued)

‡ g.s. band members.

§ Possible member of configuration= $\pi 7/2[404] \otimes \pi 9/2[514]$, $K\pi=(8-)$.

(A): The g.s. band.

@ (B): $K\pi=(8-)$ band. Configuration= $\pi 7/2[404] \otimes \pi 9/2[514]$. $\gamma(^{182}\text{Hf})$

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	Mult.	α	Comments
97.79	97.79 9	100	$E2^{\ddagger}$	3.85	Mult.: from intensity balance arguments in IT decay.
322.17	224.38 10	100	$(E2)^{\ddagger}$	0.198 4	
666.27	344.1 1	100	$(E2)^{\ddagger}$	0.0529	
818.4	720.6 4	100 10			
	818.4 4	100 25			
905.9?	808.1 5	100			
1122.07	455.80 8	100	$(E2)^{\ddagger}$	0.0245	
1172.87	50.80 8	56 7	(E1)	0.418 7	B(E1)(W.u.)= 1.26×10^{-16} 19.
					Mult.: from intensity-balance in IT decay.
	506.60 8	100 8	[M2, E3]	0.10 5	B(M2)(W.u.)= 4.0×10^{-12} 5.
1419.5	246.8 5	100			
1680.3	558.2 5	100			
1691.9	272.3 5	100 8			
	518.9 5	79 8			
1988.4	296.6 5	100 7			
	569.1 5	98 7			
2307.3	319.2 5	90 7			
	615.0 5	100 7			
2331.7	651.4 5	100			
2571.3	264		[E1]		Mult.: Weisskopf estimate supports E1.
2649.3	341.6 5	100 8			
	661.0 5	92 8			
3010.0	360.5 5	100 7			
	703.0 5	78 6			
3065.3	733.6 5	100			
3869.2	803.9 5	100			
4733.9	864.7 5	100			

† From weighted averages of values when a level is populated in more than one of the four datasets involving γ -ray studies.

‡ From intensity balance in IT decay, multipolarities of the transitions in the g.s. band up to 8+ are consistent with E2.

(A) The g.s. band

(B) $K\pi=(8-)$ band.

Adopted Levels, Gammas

Q(β⁻)=1814.5 17; S(n)=6062.94 11; S(p)=6316.9 22; Q(α)=1481.6 30 2012Wa38.

S(2n)=13639.7 13, S(2p)=14330 70 (2012Wa38).

There are about 690 neutron resonances known in the energy region: E(n)=4.28 to 3996.7 eV. See ¹⁸¹Ta(n,γ):resonances dataset for energies and width parameters.

Structure calculations:

2002Co07 (levels, configurations, particle-rotor model); 1989Ja04 (levels, band structures); 1982Si06 (2-quasiparticle band energies); 1972Ga29 (structure of g.s. and isomer of ¹⁸²Ta); 1971Re13 (Coriolis coupling analysis of bands in ¹⁸²Ta).

First identifications of ¹⁸²Ta in (n,γ): Physik Z. Sowjetunion 9, 273 (1936); 1938Oldenberg: Phys. Rev 53, 35; Naturwissenschaften 28, 578 (1940). For later studies of the decay of this isotope, see ¹⁸²Ta β⁻ decay dataset.

¹⁸²Ta Levels

The band assignments are from (n,γ) E=thermal, and from 'finger-print' method for π7/2[404]@v1/2[510] and π7/2[404]@v3/2[512] configurations in (d,p) (1971Re13).

Cross Reference (XREF) Flags

A ¹⁸² Hf β ⁻ Decay (8.90×10 ⁶ y)	F ¹⁸¹ Ta(n,γ) E=0.4-49.2 eV
B ¹⁸² Hf β ⁻ Decay (61.5 min)	G ¹⁸¹ Ta(n,γ) E=0.002-3 keV
C ¹⁸² Ta IT Decay (283 ms)	H ¹⁸¹ Ta(n,γ) E=4.28, 10.36 eV
D ¹⁸² Ta IT Decay (15.84 min)	I ¹⁸¹ Ta(n,γ) E=2 keV
E ¹⁸¹ Ta(n,γ) E=thermal	J ¹⁸¹ Ta(d,p)

E(level) [†]	Jπ [‡]	XREF	T _{1/2}	Comments
0.0 [@]	3-	ABCDEFGH I J	114.74 d [#] 12	%β ⁻ =100. μ=(+)3.02 3 (1980Al27,2014StZZ). Q=+2.6 3 (1991Fa12,2013StZZ,2014StZZ). Jπ: 3-,4- from (n,γ) E=0.002-3 keV and E=2 keV; log ft=8.35 to 2- level in ¹⁸² W rules out 4-. μ: NMR on oriented nuclei (1980Al27). Other: (+)3.02 6 (1980De22). Q: NQR on oriented nuclei (1991Fa12,1983Fa18). %IT=100.
16.273 ^g 4	5+ [§]	BCDE GHI	283 ms 3	T _{1/2} : from IT decay (1968Cl06). Jπ: M1 γ to 3-, M1 γ from 5-.
97.8304 [@] 16	4-	AB EFGHI J		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, (M1) γ from 5-.
114.3126 ^{&} 17	4-	AB EFGHI J		Jπ: M1 γ to 5+, γ to 3-.
150.150 ^h 3	4+	E GHI		T _{1/2} : from (ce)(ce)(t) in ¹⁸² Ta IT decay (15.84 min) (1968Ho11).
163.047 ^g 4	6+	B DE H	<30 ps	Jπ: M1 γ to 5+; not observed in (n,γ) E=0.002-3 keV where all low-lying 4+ levels should be populated; no primary γ from 3+,4+ capture state; Kπ=5+ band member.
173.2370 ^a 21	5- [§]	B EFG I J		Jπ: 3+,4+ from (n,γ) E=0.002-3 keV, band member.
237.2860 [@] 20	5- [§]	B EFGHI J		Jπ: parity from (n,γ) E=0.002-3 keV, M1 γ to 4+; band assignment.
245.5 10		G		T _{1/2} : from γγ(t) in (n,γ) E=thermal (1974An12).
249.982 ⁱ 3	(3)+	EFGHI		Jπ: γ from 7-, γ to 4-, not observed in (n,γ) E=0.002-3 keV.
269.047 ^h 3	(5)+	E H j		T _{1/2} : from (ce)(ce)(t) in ¹⁸² Ta IT decay (15.84 min) (1968Ho11).
270.4027 ^b 21	2- [§]	A EFGHI J	1.2 ns 2	Jπ: E3 γ from 10-.
292.9352 ^{&} 22	5- [§]	B EFGHI J		Jπ: 3-,4- for (n,γ) E=0.002-3 keV, band assignment in (d,p).
316.403 ^a 3	6-	B E J		Jπ: 3+,4+ from (n,γ) E=0.002-3 keV, γ from 5-.
331.2 7	2+,5+ [§]	I		Jπ: M1 to 5+; γ from (7-); possible configuration=Kπ=6+, π9/2[514]+v3/2[512].
334.627 ^g 5	7+	B DE H	<30 ps	Jπ: (M1) γ to 5-; γ to 6+; band assignment.
360.518 ^b 3	3-	EFGHI J		T _{1/2} : from γγ(t) in (n,γ) E=thermal (1974An12).
364.359 ⁱ 3	4+	E GH		Jπ: 2+,5+ from (n,γ) E=0.002-3 keV, γ to 2-.
390.154 7	(6)+	B E H		Jπ: (M1) γ to (5)+; band assignment.
396.335 [@] 4	(6-)	E H J		T _{1/2} : from γγ(t) in (n,γ) E=thermal (1974An12).
402.626 ^c 4	2+	E HI	1.00 ns 5	Jπ: M1 γ to 2-, not observed in (n,γ) E=0.002-3 keV.
411.306 ^h 7	(6+)	E		
443.610 ^l 3	1-	E H	2.2 ns 2	
458.2 12		G		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}Ta Levels (continued)

E(level) [†]	Jπ [‡]	XREF	T _{1/2}	Comments
475.558 ^c 6	(3)+	E I		Jπ: 3+,4+ from (n,γ) E=2 keV, band assignment.
480.036 ^b 3	4-	EFGHIJ		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, γ to 6-; band assignment in (d,p).
488.247 ^{&} 3	6-	B E J		Jπ: γ to 4-, γ from 7-, band assignment in (d,p).
491.423 ^l 3	2-§	EFGHI		
505.613 ⁱ 3	5+§	EFGHI		
519.577 16	10-	B D	15.84 min 10	%IT=100. T _{1/2} : from it decay (1966Bi10). Others: 16.2 min 5 (1947Se33), 16.4 min (1948Ho37), 16 min 2 (1950Wi67). Jπ: M4 γ to 6+; possible configuration=Kπ=10-, π9/2[514]+v11/2[615].
547.1030 ^j 25	(3)-	EFGHI		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, band assignment.
558.286 ^e 3	(1)-	E H J		Jπ: M1 γ to 1-, M1 γ from 2-, not observed in (n,γ) E=0.002-3 keV.
565.693 ^l 3	(3)-	EFG I		Jπ: 3-,4- in (n,γ) E=0.002-3 keV, (M1) to 2-.
571.638 ^c 6	4+	E GHIJ		Jπ: 3+,4+ from (n,γ) E=0.002-3 keV, band assignment.
579.436 ^h 6	(7+)	E H		Jπ: γs to 5+ and 7+; band assignment.
581.196 [@] 12	(7-)	E		Jπ: γs to 5- and (6-); band assignment.
583.272 ^e 4	(0-)	E H J		Jπ: γ to 1-; band assignment.
592.960 ^d 4	(1)+	E H		Jπ: E2 γ to 2+; γs to 2- and 1-; band assignment.
628.425 ^b 4	5-§	EFG IJ		
647.431 ^d 5	(2+)	E		Jπ: γ to 1+, band assignment.
647.652 ^k 3	(2)-	E H		Jπ: E2 γ to 2-, band assignment.
651.215 ^j 3	(4)-	EFG I		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, band assignment.
652.37 11	(9-)	B		Jπ: (M1) γ to 10-; log ft=6.3 from (8-); Possible configuration=Kπ=9-, π9/2[514]+v9/2[624].
659.862 ^l 3	(4)-	EFGHI		Jπ: 2-,3-,4- from (n,γ) E=0.002-3 keV, M1 γ to (3)-; (M1) γ from 5-.
662.8 10		G		
666.149 ^e 4	2-§	EFGHIJ		
673.041 ⁱ 4	(6+)	E H		Jπ: γs to 4+, 6+ and (6-); band assignment.
696.0		J		
701.967 ^e 4	3-	EFGHIJ		XREF: J(705.0).
719.552 ^k 3	(3)-	EFGHI		Jπ: (3)- from (n,γ) E=0.002-3 keV, M1 γ to 2-.
723.981 ^d 6	3+	E		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, γ to (1)-.
740.132 ^m 3	(2)-	EFGHI		Jπ: γs to 2-, 2+ and 4+.
749.080 5	(3)+	E H		Jπ: 2-,3-,4- from (n,γ) E=0.002-3 keV; γ to 1-, band assignment.
776.391 25	(7-)	B E J		Jπ: M1 γ to 2+; γs to 1- and 5+ Possible configuration=π5/2[402]-v11/2[615], Kπ=3+.
781.396 ^j 4	5-§	Efg i		Jπ: γs to 5- and 6+; γ from 7-; proposed configuration is Kπ=7-, π7/2[404]+v7/2[503] in (d,p) from σ data; absence of primary γ from 3+,4+ capture state supports high spin.
782.538 ^l 4	(5-)	EFG i		Jπ: (M1) γ to (4)-; band assignment.
791.0 16		G		
805.071 ^b 13	(6-)	E J		Jπ: γs to 4- and 6-; band assignment.
817.021 ^k 4	(4)-	EFGHI		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, band assignment.
830.5 16		G		
835.289 ^m 5	3-	EFGHI		Jπ: 3-,4- from (n,γ) E=0.002-3 keV, γ to 1-.
843.30 25	3-, 4-, 5-§	FG IJ		
856.052 ^e 4	(4)-	EFGHI		Jπ: M1,E2 γ to 3-; γ to 5- and 2-; band assignment.
866.3 4	2-, 5-§	G IJ		
881.4 6	3+, 4+, 5+§	EFG I		
897.80 25	3-, 4-§	EFG IJ		
909.8 6	5-§	Efg I		
915.4 5	3-, 4-§	Efg I		
935.8 13	(2 to 5)+§	I		
939.634 ^k 5	5-§	EFGHI		
960.415 ^m 6	(4-)	EFGHI		Jπ: (M1) γ to 3-; band assignment; assigned 3-,4- in (n,γ) E=0.002-3 keV, but this level is not resolved from 960.5 level.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}Ta Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF	Comments
960.528 ^e 5	(5-)	Ef	J π : γ s to (4)- and 3-; band assignment, not resolved from 960.4 in (n, γ) E=0.002-3 keV.
987.0 8	3-, 4- $\S$	EFG I	
1000.3 6	3-, 4- $\S$	E G	
1003.4 3	2-, 5- $\S$	I	
1021.6 15	3+, 4+ $\S$	G	
1028.2 6	3-, 4- $\S$	EFG I	
1049.9 9	3-, 4- $\S$	FG I	XREF: F(1054.2).
1057.3 6	3-, 4- $\S$	EFG I	
1082.0 5	3-, 4- $\S$	EFG I	
1101.2 8	5- $\S$	EFG I	
1113.6 5	5- $\S$	EFG I	
1115.96 ^f 5	(7-)	B	J π : log ft =4.61 from (8-); γ to 5-.
1125.0 15	(2-, 5-) $\S$	EFG I	
1136.9 6	3-, 4- $\S$	EFG I	
1150.4 5	3-, 4- $\S$	EFG I	
1170.4 6	3-, 4- $\S$	EFG I	
1196.0 10	2-, 3-, 4- $\S$	FG I	
1203.1 18	3+, 4+, 5+ $\S$	G	
1216.1 11	2- $\S$	G I	
1229.7 5	3-, 4- $\S$	EFG I	
1240.4 5	3-, 4- $\S$	EFG I	
1260.1 5	3-, 4- $\S$	EFG I	
1269.5 5	3-, 4- $\S$	EFG I	
1279.8 5	3-, 4- $\S$	EFG I	
1284.4 5	3-, 4- $\S$	G	
1289.5 7		I	
1298.6 10	2, 3, 4, 5 $\S$	G	
1302.5 6	3-, 4- $\S$	FG I J	
1321.0 15	3-, 4- $\S$	fG I	
1326.0 22	5- $\S$	fG	
1332.5 15		E	
1336.84 ^f 12	(8-)	B	J π : log ft =5.1 from (8-); band member.
1350.5 9	3-, 4- $\S$	G	
1360.4 8	5- $\S$	G	
1371.1 5	3-, 4- $\S$	E G I	
1377.3 14	3-, 4- $\S$	G I	
1389.0 5	3-, 4- $\S$	E G I	
1393.4 8	3-, 4- $\S$	G I	
1396.2 8		E	
1416.7 15	3-, 4- $\S$	G I	
1433.2 5		E	
1445.1 16	3-, 4- $\S$	E G I	
1452.2 30	3-, 4- $\S$	G	
1471.9 7	3-, 4- $\S$	G	
1479.7 5	3-, 4- $\S$	G j	
1482.9 6		E j	
1490.4 15	3-, 4- $\S$	G j	
1496.4 5	3-, 4- $\S$	E G J	XREF: J(1511).
1527.1 5	3-, 4- $\S$	E G	
1538.1 15	3, 4, 5 $\S$	G j	
1541.7 6	3-, 4- $\S$	G j	
1545.6 23	2- $\S$	G j	
1551.6 5	5- $\S$	G j	
1555.7 8	5- $\S$	G	
1570.8 12	2- $\S$	G J	
1577.2 8	3-, 4- $\S$	G	
1579.8 5		E	
1582.3 6	3-, 4- $\S$	G	
1604.9 17	3-, 4- $\S$	E G	
1612.0 8	3-, 4- $\S$	G j	
1617.5 25	3-, 4- $\S$	E G j	
1628.3 8	3-, 4- $\S$	G J	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}Ta Levels (continued)

E(level) [†]	$J\pi^{\ddagger}$	XREF	Comments
1635.6 8	3-, 4-§	G	
1641.8 15	3-, 4-§	G	
1646.1 20	(2 to 5)	G	$J\pi$: primary γ from 3+, 4+.
1650.5 27	5-§	G	
1657.6 6	2-, 3-, 4-§	G j	
1661.7 6	5-§	G j	
1667.0 15	(2 to 5)	G j	$J\pi$: primary γ from 3+, 4+.
1674.3 6	3-, 4-§	G	
1679.6 5	3-, 4-§	E G	
1695.4 5	3-, 4-§	E G J	
1701.1 15	3-, 4-§	G	
1711.6 12	3-, 4-§	G j	
1714.1 5		E j	
1724.7 9	3-, 4-§	G	
1734.1 9	3, 4§	G	
1746.5 9	3-, 4-§	E G j	
1756.3 14	5-§	G j	
1762.5 12	5-§	G j	
1765.9 19	(2 to 5)	G j	$J\pi$: primary γ from 3+, 4+.
1769.6 10	3, 4§	G j	
1778.3 12	3-, 4-§	G	
1803 7		J	
1827 7		J	
1843.0 5		E J	XREF: J(1853).
1890.2 5		E J	
1905.0 5		E J	
1924.5 6		E	
1944.8 6		E	
1960.3 6		E J	
1984 7		J	
2009.0 5		E	
2017.2 5		E	
2029.7 5		E J	
2043 7		J	
2055 7		J	
2080.8 6		E	
2146 7		J	
2160.6 7		E J	
2180.2 5		E	
2274 7		J	
2369 7		J	
2394 7		J	
2420 7		J	
2478 7		J	
2659 7		J	
2674 7		J	
(6062.92 11)	3+, 4+	E	E(level): S(n)=6062.94 11 (2012Wa38), neutron capture state. $J\pi$: s-wave capture in 7/2+ g.s. of ^{181}Ta . Component of J=4 is deduced as 73% 24 from (pol n, γ) experiment (1970Ei04) with circular polarization of integral γ -ray spectrum in 1.7–8 MeV region.
(6064.94 11)	3+, 4+	I	E(level): S(n)+2 keV, where S(n)=6062.94 11 (2012Wa38). $J\pi$: s-wave capture in 7/2+ g.s. of ^{181}Ta .

[†] From least-squares fit to E γ data. Reduced $\chi^2=3.2$ as compared to critical $\chi^2=1.3$. Nine γ rays out of 211 γ rays deviate by 3 or more σ values.

[‡] For levels populated by $^{182}\text{Ta}(n,\gamma)$ E=0.002–3 keV 1977St15 excited 19 (n, γ) resonances between 4–200 eV with known spin and parity (3+ or 4+). They also excited broad resonances at 20–100, 100–200, 200–400, 600–1000, and 1000–3000 eV. From the relative intensity of primary γ rays in broad resonance capture, strong M1,E1 feeding J=3,4 levels was distinguished from weak M1,E1 feeding to J=2,5 levels. Population by discrete resonance capture γ rays allowed discrimination between J=2 and J=5. All low-lying levels with J=2,3,4,5 are assumed to be populated by the resonance capture.

§ From (n, γ) E=0.002–3 keV.

Adopted Levels, Gammas (continued) ^{182}Ta Levels (continued)

The following measured values (in days) have been used in the different averaging procedures in the AVETOOLS computer code available at ANU website to arrive at the recommended value: 114.43 4 (1980Sc07, 4 π ionization chamber), 114.740 24 (1973Vi13, well-type NaI(Tl) detector, authors quoted uncertainty of 0.08 is 3.3 σ), 115.0 2 (1972Em01, 4 π ionization chamber), 117.3 10 (1967Wa29, differential ionization chamber), 118.4 5 (1958Sp17, GM counter), 114.80 12 (1958Ke26), 115.05 25 (1957Wr37, single-ion chamber, same group as 1972Em01 but different experimental setup used), 111.2 5 (1952Ei12, single-ion chamber), 111 1 (1951Si25, single-ion chamber), 117.5 18 (Meitner, Ann.Phys. 6, 113 (1948)), 117 3 (1947Se33), 117 3 (Zumstein et al., Phys.Rev. 63, 59 (1943)). Others: 97 8 (Oldenberg: Phys Rev 53, 35 (1938)), 200 100 (Fomin and Houtermans: Physik Zeits d. Sowjetunion 9, 273 (1936)). The above measurements present a discrepant set of values; the weighted average or the LWM methods, both giving 114.62 12, are unacceptable with normalized $\chi^2=15.5$. The normalized residuals method (NRM) gives 114.74 5 with normalized $\chi^2=3.8$, somewhat larger than the critical χ^2 ; with the following uncertainties adjusted: 0.04 to 0.12 in 1980Sc07, 0.5 to 1.4 in 1958Sp17 and 1952Ei12, 1 to 1.4 in 1951Si25. The Rajeval (RT) method gives 114.744 23 with $\chi^2=2.2$, but with larger adjustments in the uncertainties. Selection of the five most precise data points (1980Sc07, 1973Vi13, 1972Em01, 1958Ke26, 1957Wr37) gives 114.739 23 with $\chi^2=2.2$ using the NRM method, with uncertainty adjustment from 0.04 to 0.14 in 1980Sc07. Weighted average and the LWM method give 114.62 12, still suffer from high χ^2 of 10.5. Thus the evaluators recommend value of 114.739 23 from NRM method used on five most precise data points, but with uncertainty increased to 0.1%, to account for any systematic uncertainties which may not have been included in some of the precisely quoted measurements used in the present analysis.

@ (A): $K\pi=3-, \pi 7/2[404]-v1/2[510]$.

& (B): $K\pi=4-, \pi 7/2[404]+v1/2[510]$.

a (C): $K\pi=5-, \pi 7/2[404]+v3/2[512]$.

b (D): $K\pi=2-, \pi 7/2[404]-v3/2[512]$.

c (E): $K\pi=2+, \pi 7/2[404]-v11/2[615]$.

d (F): $K\pi=1+, \pi 7/2[404]-v9/2[624]$.

e (G): $K\pi=0-, \pi 7/2[404]-v7/2[503]$.

f (H): $K\pi=7-, \pi 7/2[404]+v7/2[514]$.

g (I): $K\pi=5+, \pi 9/2[514]+v1/2[510]$.

h (J): $K\pi=4+, \pi 9/2[514]-v1/2[510]$.

i (K): $K\pi=3+, \pi 9/2[514]-v3/2[512]$.

j (L): $K\pi=3-, \pi 5/2[402]+v1/2[510]$.

k (M): $K\pi=2-, \pi 5/2[402]-v1/2[510]$.

l (N): $K\pi=1-, \pi 5/2[402]-v3/2[512]$.

m (O): $K\pi=2-, \pi 1/2[411]+v3/2[512](?)$. Configuration is tentative.

 $\gamma(^{182}\text{Ta})$

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult.@	δ	α	Comments
16.273	(16.273 4)	100	(M2)		43000	B(M2)(W.u.)=6.6 $\times 10^{-5}$ 2. E γ : deduced from level-scheme fitting procedure (evaluators). This E γ is adopted in all the other datasets. Apparently, there is no direct measurement of this energy.
97.8304	97.8318 19	100	M1		4.64	
114.3126	114.3151 25	100	(M1)		2.97	
150.150	133.877 3	100 11	M1(+E2)	<0.5	1.89	δ : from ce data in (n, γ) E=thermal.
	150.142 4	1.28 17				
163.047	146.7731 25	100	M1		1.460	B(M1)(W.u.)>0.090.
173.2370	58.9277 19	65 8	(M1)		3.44	
	75.414 5	100 57	(M1)		9.81	
237.2860	122.9727 25	55 6	(M1+E2)		2.0 4	
	139.455 3	100 9	M1		1.687	
	237.287 4	20.9 19				
249.982	99.8304 22	100 8	M1		4.38	
	233.714 4	23.3 17				
	249.955# 7	2.4 3				E γ : level-energy difference=249.982.
269.047	106.006 11	8.4 20				
	118.8960 25	100 9	M1		2.66	
	252.769 5	15.8 13				
270.4027	156.089 3	9.8 9	E2		0.700	B(E2)(W.u.)=6.3 13.
	172.563 9	0.38 7	[E2]		0.492	B(E2)(W.u.)=0.15 4.
	270.406 4	100 5	E2(+M1)	>3	0.120 8	δ : from ce data in (n, γ) E=thermal. B(E2)(W.u.)=4.1 8.
292.9352	119.700 3	47 6	(M1)		2.61	
	178.621 3	100 6				
	195.111 3	82 6				
316.403	143.177# 3	100 9	(M1, E2)		1.3 3	E γ : level-energy difference=143.166.

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ta})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. [@]	α	Comments
316.403	218.550 14	3.0 4			
334.627	65.573& 4				
	171.579 3	100 5	M1	0.940	B(M1)(W.u.)>0.067.
	318.381 23	14.0 9	E2	0.0688	B(E2)(W.u.)>6.2.
360.518	90.120 6	29 14			
	246.204 5	17.4 14			
	262.666 16	2.9 6			
	360.531 8	100 6	M1, E2	0.09 4	
364.359	114.376 3	100 10			
	214.207 3	33.8 15	M1	0.507	
	348.086 7	14.0 10			
390.154	227.112 12	12.1 24			
	373.880 7	100 5	M1, E2	0.08 4	
396.335	159.047 3	100 9	(M1)	1.164	
	233.24 9	30 10			
	282.026 12	13.5 17			
	298.501 13	18.3 17			
402.626	132.231 10	0.72 19	[E1]	0.1772	B(E1)(W.u.)=6.4×10 ⁻⁷ 18.
	402.619 7	100 6	E1	0.01106	B(E1)(W.u.)=3.2×10 ⁻⁶ 4.
411.306	142.270 20	100 31	(M1)	1.594	
	248.268 21	10.6 25			
	261.18 3	9 3			
	395.01 3	18 4			
443.610	173.204 3	100 7	M1	0.916	B(M1)(W.u.)=0.00098 14.
	443.591 13	3.10 17	[E2]	0.0274	B(E2)(W.u.)=0.0038 5.
475.558	72.929 6	100			
480.036	119.516 4	60 8	(M1)	2.62	
	163.637 10	22 10			
	209.633 4	28.0 24			
	242.745 8	17.2 16			
	306.76 3	9.6 16			
	365.73 5	8.4 16			
	382.186 10	100 4	M1, E2	0.07 4	
	480.022 15	84 12			
488.247	171.868# 5	78 15			E_{γ} : level-energy difference=171.844.
	195.329# 5	100 9			E_{γ} : level-energy difference=195.312.
	250.972 6	84 6			
	315.003 11	72 8			
	390.40 3	41 7			
491.423	47.8096 17	100 26	M1	6.35	
	130.910 6	9.0 18			
	491.26 7	12 4			
505.613	141.245 3	100 15	M1	1.627	
	236.561 4	23.9 18			
	255.607 8	10.0 12			
	268.19 5	6 3			
	332.30 3	7.0 18			
	342.544 23	6.4 15			
	355.477 14	12.1 12			
519.577	184.951 15	100 6	E3	3.20	B(E3)(W.u.)=2.03×10 ⁻⁵ 21.
	356.47 10	1.19 13	M4	4.76	E_{γ} , Mult.: from ^{182}Ta IT decay (15.84 min). B(M4)(W.u.)=0.20 3. E_{γ} , Mult.: from ^{182}Ta IT decay (15.84 min).
547.1030	144.464 5	1.7 3			
	182.750 3	7.9 4			
	276.713 5	4.0 3			
	297.123 5	100 4	E1	0.0226	
	396.952 9	10.0 4			
	432.81 6	1.1 4			
	547.16 4	2.8 4			
558.286	114.6788 24	100 10	M1	2.95	
	155.650 7	4.5 10			
	558.29 9	7.3 14			

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ta})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\ddagger}$	Mult. @	α	Comments
565.693	74.266 3	100	(M1)	10.25	
571.638	96.077 6	40 13			
	278.705 22	13 3			
	473.796 16	100 10			
579.436	168.132 5	52 5			
	244.808 4	100 7			
	416.36 5	17 3			
	563.54 19	34 11			
581.196	184.859 14	100 26			
	343.912 18	66 11			
583.272	139.662 3	100			
592.960	149.345 7	6.3 11			
	190.338 3	100 8	E2	0.351	
	322.546 6	19.0 13			
628.425	148.391 4	55 6			
	232.079 9	19 3			
	267.908 5	59 4			
	391.140 16	46 4			
	514.11 4	36 11			
	530.63 3	100 7			
647.431	54.4710 24	100 25	[M1]	4.33	
	647.46 5	60 5			
647.652	81.951 5	20 7			
	100.553 3	50 9			
	156.233 4	39.1 22			
	204.039 4	21.7 15			
	287.135 6	19.3 22			
	377.248 7	100 4	E2,M1	0.08 4	
	550.25 16	11 3			
651.215	104.115 3	100 25	M1,E2	3.5 4	
	286.861 6	30 3			
	358.40 6	7 4			
	401.221 10	61 4			
	501.08 3	46 4			
	536.80 4	39 7			
	651.34 7	35 5			
652.37	132.8 ^S 1	100	(M1)	1.94	
659.862	94.1677 25	100 19	M1	5.18	
	168.462 10	4.2 9			
	299.33 4	3.2 15			
	422.76 7	7.6 14			
666.149	82.880 9	22 10			
	107.865 4	100 10	M1	3.51	
	174.722 6	7.0 12			
	222.541 7	6.2 10			
673.041	167.412 [#] 3	57 5			E γ : level-energy difference=167.428.
	184.810 [#] 3	19 9			E γ : level-energy difference=184.793.
	308.683 22	11 4			
	509.936 21	100 24			
701.967	136.256 [#] 8	11.2 24			
	143.684 4	26 3			
	210.544 3	100 6	M1	0.532	
	431.68 5	11 3			
	464.56 5	19.1 21			
719.552	59.692 4	70 22			
	71.900 5	100 26			
	161.267 9	22 7			
	172.456 5	21 3			
	228.117 6	12.2 17			
	239.513 13	10.9 17			
	359.001 16	18.3 22			
	449.137 22	36 3			
	482.17 7	35 17			

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ta})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. @	α	Comments
723.981	76.557 10	100 45			
	152.341 4	59 7			
	321.355 11	39 4			
	453.74 6	36 6			
	573.73& 15	28 16			
	708.10& 22	73 36			
740.132	92.480 3	100 12	M1	5.46	
	174.453 8	12.8 24			
	248.701 11	8.0 12			
	260.085 4	60 4			
	296.537 8	31 6			
749.080	101.442 7	17 7			
	257.639# 6	14.6 14			E_{γ} : level-energy difference=257.657.
	346.465 7	100 8	M1	0.1370	
	478.694 19	41 5			
	499.05 4	46 8			
	732.41 15	24 8			
776.391	386.27 4	43 5			
	483.67 9	39 6			
	538.85 9	32 10			
	603.14 4	100 7			
	613.23 14	30 6			
781.396	121.534 3	60 5			
	130.182 3	75 10			
	234.276 9	16.5 25			
	416.95 6	25 4			
	465.11 9	24 12			
	488.44 7	24 7			
	512.43 4	100 45			
	683.58 14	80 10			
782.538	122.675 3	100 10	(M1)	2.43	
	216.822 14	5.1 10			
	489.525& 22	36 3			
805.071	325.041 14	51 5			
	408.67 4	43 6			
	488.89 8	56 32			
	567.71 5	100 12			
817.021	97.466 4	100 12			
	165.809 5	16.8 24			
	188.662# 22	12 4			E_{γ} : level-energy difference=188.596.
	251.322 7	16.8 16			
	336.953 25	12 4			
	456.57 3	22 3			
	566.92 9	24 7			
835.289	95.155 3	100 10	(M1, E2)	4.8 3	
	269.646 17	23 13			
	391.83 6	15 4			
	597.72 24	19 7			
856.052	73.499 8	50 23			
	154.085 3	100 9	M1, E2	1.0 3	
	189.909 7	6.1 11			
	196.24 4	3.9 19			
	290.363 6	19.1 16			
	308.85 6	5.0 18			
939.634	122.612 3	100 14			
	220.16 4	20 8			
	279.777 10	24 4			
	549.51& 4	56 6			
960.415	125.126 3	100	(M1)	2.30	
960.528	104.476 5	100 20			
	143.511 6	68 12			
	258.551 11	40 4			
	300.649 16	32 5			

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ta})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. @	Comments
1115.96	339.6 § 1	30 3		
	627.4 § # 1	5.6 15		E_{γ} : level-energy difference=627.7.
	799.6 § 1	50 6		
	823.2 § 1	14 3		
	942.8 § 1	100 9		
	952.9 § 1	1.3 6		
1336.84	220.8 § 1	100		
(6062.92)	3882.7 6	25 10		
	3902.3 7	19 8		
	3982.1 6	33 10		
	4033.1 5	13 6		
	4045.7 5	30 10		
	4053.9 5	29 11		
	4102.6 6	13 6		
	4118.1 6	9 5		
	4138.4 6	17 5		
	4157.9 5	22 8		
	4172.7 5	22 8		
	4219.8 5	27 8		
	4315.6 5	68 6		
	4348.8 5	13 6		
	4366.2 6	22 6		
	4383.2 5	17 5		
	4444.0 5	25 5		
	4458.2 6	14 6		
	4483.1 5	41 8		
	4536.1 5	25 5		
	4566.4 6	24 6		
	4580.0 6	25 5		
	4618.0 5	37 6		
	4629.7 5	11 4		
	4666.6 8	9 4		
	4673.4 6	13 4		
	4691.7 5	30 6		
	4739.4 5	25 5		
	4782.3 5	73 6		
	4793.1 5	37 6		
	4802.9 5	33 6		
	4821.8 5	11 4		
	4833.2 5	25 5		
	4890.6 8	3.3 13		
	4912.6 5	22 4		
	4925.9 6	5 2		
	4937.8 5	12 4		
	4949.3 5	8 3		
	4961.7 4	5 3		
	4980.2 5	21 2		
	5005.6 5	29 3		
	5034.6 5	13 3		
	5062.5 6	4.0 16		
	5075.8 8	4.0 16		
	5102.2 5	15 3		
	5123.0 5	9 3		
	5147.4 4	9 3		
	5153.0 6	11 3		
	5165.4 5	7 2		
	5181.4 5	4.9 14		
	5206.8 5	30 3		
	5227.7 6	7 2		
	5245.8 5	38 4		
	5280.6 5	9 2		
	5343.3 5	35 4		
	5396.6 5	7 4		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ta})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. [@]	E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$
(6062.92)	5402.7 5	4 2		(6064.94)	5061.6& 6	24 4
	5411.9 5	7 3			5078.6 5	34 3
	5434.6 5	7 3			5103.7 5	41 4
	5497.0 5	10 2			5124.9 6	18 3
	5515.7 5	18 2			5129.1 14	3.7 15
	5557.4 5	7.9 16			5149.1 6	26 4
	5583.8 6	10 2			5154.8 5	44 7
	5665.5 8	2.5 10	[M2, E3]		5167.0 5	31 3
	5702.1 6	4.0 8			5183.0 9	8.4 21
	5769.9 5	11.9 13			5198.6 6	17 4
	5792.5 5	20 2			5209.0 5	25 4
	5812.6 8	3.0 10			5221.6 5	34 5
	5825.0 8	1.8 8			5229.4 5	37 6
	5889.6 7	6.5 13			5248.0 5	50 5
	5912.1 6	3.0 13			5283.0 5	44 4
	5948.7 5	14.0 14			5324.6 5	23 3
	5965.0 5	100			5345.3 5	32 5
	6062.9 5	60 3			5362.9 5	34 3
(6064.94)	4618.9 7	28 6			5399.1 7	29 4
	4648.5 6	29 4			5405.8 7	30 5
	4671.0 6	28 6			5415.2 5	58 6
	4676.5 6	29 6			5436.4 5	29 3
	4688.1 7	26 5			5493.4 9	9.3 23
	4693.6 7	34 7			5499.3 5	47 3
	4742.4 6	49 7			5517.9 5	51 4
	4761.4 6	21 3			5558.6 9	4.0 12
	4783.8 6	37 6			5573.1 7	18 3
	4794.6 7	21 4			5584.9 5	62 4
	4805.5 7	18 4			5590.5 9	9 3
	4824.5 6	20 3			5663.1 9	4.9 15
	4835.1 6	26 5			5704.1 5	74 5
	4848.6 9	18 5			5733.7 9	4.7 19
	4867.0 6	32 5			5772.0 5	24.6 25
	4895.3 6	11.4 23			5794.5 5	28.9 20
	4914.6 6	19 4			5815.2 6	9.0 18
	4927.7 6	21 3			5827.5 5	39 3
	4939.8 6	17 3			5891.5 5	23.7 17
	4951.4 7	10.1 20			5914.4 6	10.0 20
	4964.2 6	18 3			5950.7 5	89 4
	4982.3 5	42 4			5967.2 5	100
	5007.7 5	44 4			6049.1 10	4.9 15
	5014.4 6	36 5			6064.9 5	101 5
	5035.5 5	34 3				

[†] From (n, γ) E=thermal, unless otherwise stated.[‡] Primarily from (n, γ) E=thermal. Values from the decay studies are also considered when a level is populated in them.[§] From ^{182}Hf β^- decay (61.5 min).

Poor fit in the level scheme.

[@] From ce data in ^{181}Ta (n, γ) E=thermal, ^{182}Hf β^- decay, and ^{182}Ta IT decays. Intensity-balance arguments are also used in some cases.

& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)(L) $K\pi=3-, \pi 5/2[402] + \nu 1/2[510]$ (M) $K\pi=2-, \pi 5/2[402] - \nu 1/2[510]$ (N) $K\pi=1-, \pi 5/2[402] - \nu 3/2[512]$ $^{182}_{73}\text{Ta}_{109}$

Adopted Levels, Gammas (continued)

(O) $K\pi=2-$,
 $\pi 1/2[411]+\nu 3/2[512](?)$.

Adopted Levels, Gammas

Q(β⁻)=-2800 100; S(n)=8066 5; S(p)=7095.1 17; Q(α)=1765.0 19 2012Wa38.

S(2n)=14751.8 20, S(2p)=13043.9 10 (2012Wa38).

First identification of ¹⁸²W isotope by Aston: Nature 126, 913 (1930).

Other reactions:

⁹Be(²⁰⁸Pb,X) E=1 GeV/nucleon: 2002Pf01: Measured fragment yield, (fragment)γ coin, deduced isomer (at 2230 keV)

half-life and isomer production ratio of 10% 2.

Mass measurements: 2012Li52, 1977Sh04, 1970Mc03, 1961De21, 1960Bh02.

Structure calculations (levels, moments, transition probabilities, high-K isomers, etc.): 2013Zh43, 2012Bu01,

2012Ze02, 2012Zh23, 2011Er04, 2008Sa21, 2003Jo10, 1998Sh01, 1996Na08, 1996Na12, 1994Be21, 1994Mo07, 1993Be25,

1991Gr14, 1990Ch50, 1990Ve01, 1989Sa19, 1989Ta06. Only selected references are given here, consult NSR database

at www.nndc.bnl.gov website for more detailed bibliography for theoretical studies on ¹⁸²W nuclide.

¹⁸²W Levels

Details of the measurements of Half-life (in ns) of the 100.1, 2+ state:

1. Deduced from B(E2) values in Coulomb excitation: 1.44 7 (1961Ha21), 1.26 11 (1963Gr04), 1.340 30 (1968St13), 1.368 29 (1973Be40, earlier value from the same lab is 1.31 15, 1958Mc02), 1.15 12 (1989Ku04), 1.53 7 (1991Wu05, earlier value is 1.41 9 in 1989Wu04).
2. Delayed coincidence method in Coulomb excitation: 1.366 14 (1961Ke07), 1.43 4 (1962Bi05, earlier value from the same group is 1.55 14, 1959Bi10).
3. Pulsed beam: (p,p'γ): 1.372 14 (1964Sc21).
4. Deduced from B(E2) in Muonic atom: 1.343 40 (1970Hi03).
5. Deduced from B(E2) in (e,e'): 1.391 21 (1987PeZV, 1988PeZW).
6. Delayed coincidence in ¹⁸²Ta β⁻ decay: 1.27 10 (1955Su64, 1954Su10), 1.55 11 (1963Ba24), 1.26 4 (1963Fo02), 1.41 6 (1963Ko02), 1.47 9 (1964Ro19), 1.4 1 (1964Be36), 1.39 3 (1965Do02), 1.37 3 (1965Me08), 1.45 4 (1966Bi08), 1.35 7 (1966Fu03), 1.43 5 (1966Ra04), 1.48 3 (1970Ab14), 1.380 20 (1971Ho14), 1.55 5 (1973GrXX), 1.380 30 (1983El02).

Cross Reference (XREF) Flags

A ¹⁸²Ta β⁻ Decay (114.74 d)

B Muonic Atom

C ¹⁸²Re ε Decay (64.2 h)

D ¹⁸²Re ε Decay (14.14 h)

E ¹⁸⁶Os α Decay

F ¹⁷⁶Yb(⁹Be,3nγ)

G ¹⁷⁶Yb(¹³C,α3nγ)

H ¹⁸⁰Hf(α,2nγ)

I ¹⁸⁰W(t,p)

J ¹⁸²W(γ,γ): Mossbauer

K ¹⁸²W(γ,γ')

L ¹⁸²W(e,e')

M ¹⁸²W(n,n'γ)

N ¹⁸²W(n,n')

O Others:

¹⁸²W(p,p'),(pol p,p'),(α,α')

¹⁸²W(d,d')

Coulomb Excitation

¹⁸³W(d,t)

¹⁸³W(³He,α)

¹⁸⁴W(p,t)

¹⁸⁶W(n,5nγ)

E(level) [†]	Jπ [‡]	XREF	T _{1/2}	Comments
0.0@	0+	ABCDEFGHIJKLMNO	stable	T_{1/2}: T_{1/2}(α decay) measured limits: ≥7.7×10²¹ y (2004Co26) with 90% confidence limit. Others: ≥1.7×10²⁰ y (2003Da05, 2003Bi13, 1997Ge15, 1995Ge17), ≥2.5×10¹⁹ y (2003Ce01), 1960Be13. (⟨r²⟩)^{1/2}(rms charge radius)=5.3559 fm 17 (2013An02, evaluation). Δ⟨r²⟩(¹⁸²W-¹⁸⁰W)=0.068 fm² 4 (1994Ji02). Δ⟨r²⟩(¹⁸³W-¹⁸²W)=0.052 fm² 3 (1994Ji02). Δ⟨r²⟩(¹⁸⁴W-¹⁸²W)=0.099 fm² 5 (1994Ji02).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}W Levels (continued)

E(level) [†]	$J\pi^{\ddagger}$	XREF	$T_{1/2}$	Comments
100.10598 [@] 7	2+	ABCD FGHIJKLMNO	1.381 ns 10	$\mu=+0.521$ 16 (1968Pe06,2014StZZ). $Q=-2.13$ 35 (1977RuZV,2014StZZ,2013StZZ). μ: Mossbauer effect (1968Pe06). Other: +0.528 12 (CEAD,1972Ca12). Q: reorientation method in Coul. Ex. (1977RuZV). $B(E2)\uparrow=4.17$ 6. $B(E2)$ from Coul. Ex. $T_{1/2}$: from several weighted averaging methods (weighted average, limitation of statistical weights method (LWM), normalized residuals method (NRM) and Rajeval's technique (RT)) using 26 independent measurements (from 1954 to 1991) of lifetimes from Coulomb excitation, delayed coincidence methods, pulsed beam, (e,e') and muonic atom. The value of χ^2 is ≈ 2.1 for different methods as compared to critical χ^2 of 1.7. All the values used in the averaging procedure are listed above in the header comments of this table 2001Ra27 evaluation (of 27 measurements from 1954 to 1988) gives nearly the same adopted $B(E2)(\uparrow)=4.20$ 8 and mean lifetime (τ)=1990 ps 20 ($T_{1/2}=1.379$ ns 14). $J\pi$: E2 γ to 0+.
329.4268 [@] 6	4+	A CD FGHI LMNO	62 ps 3	$\mu=+0.88$ 17 (1972Be94,2014StZZ). $B(E4)=0.077$ 16 (1987PeZV) from (e,e'). μ: IPAC (1972Be94). $T_{1/2}$: from RDM in Coul. ex. $J\pi$: $\Delta J=2$, E2 γ to 2+.
680.42 [@] 5	6+	A C FGH LMNO	8.2 ps 9	$B(E6)=0.012$ 5 (1987PeZV) from (e,e'). $T_{1/2}$: from RDM in Coul. ex. $J\pi$: stretched E2 γ to 4+.
1135.82 ^{&} 10	0+	A I MNO		$J\pi$: L(p,t)=0. Also L(t,p)=0 and E0 transition to 0+.
1144.32 [@] 12	8+	FGH LM O	2.01 ps 17	$B(E8)=0.00029$ 17 (1987PeZV) from (e,e'). $T_{1/2}$: from RDM in Coulomb excitation. $J\pi$: $\Delta J=2$, E2 γ to 6+; band assignment.
1221.4001 ^a 10	2+	A CD HI MNO	0.434 ps 11	$J\pi$: E2 γ to 0+. $T_{1/2}$: from B(E2) in Coulomb excitation. $B(E2)(IS)(\uparrow)=0.146$ 11 ((pol p,p') 1987Ic04). This gives $B(E2)(W.u.)=4.8$ 4 compared to 3.4 from Coul. ex.
1257.4121 ^{&} 11	2+	A CD HI MNO	1.71 ps 13	$J\pi$: E2 γ to 0+. $T_{1/2}$: from B(E2) in Coulomb excitation and adopted branching ratios.
1289.1498 ^b 10	2-	A CD GH M O	1.12 ns 4	$\mu=+1.74$ 24 (1973Se14,2014StZZ). μ: IPAC (1973Se14). $J\pi$: M2 γ to 0+. $T_{1/2}$: from $(\beta)(ce)(t)$ and $\beta\gamma(t)$ in ^{182}Ta β^- decay. Weighted averaging method (normalized residuals) used.
1331.1153 ^a 10	3+	A CD H MNO	<0.6 ns	XREF: N(1309). $J\pi$: M1+E2 γs to 2+ and 4+.
1373.8301 ^b 10	3-	A CD GH MNO	78 ps 10	$T_{1/2}$: from $\gamma\gamma(t)$ in ^{182}Ta β^- decay. XREF: N(1357). $\mu=0.96$ 27 (1972He10,2014StZZ). μ: IPAC (1972He10). Other: 2.21 34 (IPAC,1973Se14). $J\pi$: E3 γ to 0+.
1442.835 ^a 9	4+	A CD HI MNO	0.32 ps 3	$T_{1/2}$: from (ce)(ce)(t) in ^{182}Ta β^- decay. $J\pi$: M1+E2 γ to 4+; E2 γ to 2+; (E1) γ from 5-; band assignment. $T_{1/2}$: from B(E2) in Coul. ex. $B(E4)(IS)(\uparrow)=0.0122$ 25 ((pol p,p') 1987Ic04) which gives $B(E4)(W.u.)=2.0$ 4.

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Adopted Levels, Gammas (continued) ^{182}W Levels (continued)

E(level) [†]	$J\pi^{\ddagger}$	XREF			$T_{1/2}$	Comments
1487.5018 ^b 10	4-	A	CD	GH	MN	<49 ps
1510.22 ^{&} 4	4+	A	C	H	M O	XREF: N(1492). J π : M2+E3 γ to 2+; M1+E2 γ from 5-.
1553.2240 ^f 10	4-	A	CD	GH	MNO	$T_{1/2}$: from (ce)(ce)(t) in ^{182}Ta β^- decay. J π : E2 γ to 2+; E2+M1 γ to 4+; γ from 5-.
1621.284 ^b 21	5-		C	GH	Mno	$T_{1/2}$: from $\gamma\gamma(t)$ in ^{182}Ta β^- decay. J π : M2+E3 γ to 2+; M1+E2 γ from 5-.
1623.51 ^a 4	(5)+		C	H	Mno	J π : M1 γ from 6-; E1 γ to 4+.
1660.383 ^f 21	5-		C	GH	MNO	J π : E1 γ from 6-; band assignment. XREF: N(1678).
1711.99 [@] 14	10+		FGH		O	J π : E1+M2 γ to 4+; M1+E2 γ to 5-; M1 γ from 6-.
1756.75 ^g 4	6+		C	GH	MN	$T_{1/2}$: from RDM in Coulomb excitation. J π : $\Delta J=2$, E2 γ to 8+; band assignment. XREF: N(1745).
1765.53 12					M O	J π : log $ft=7.4$ from 7+, E2 γ to 4+.
1768.943 ^f 23	6-		C	GH	M O	J π : E1+M2 γ to 6+; E2 γ s to 4-; band assignment.
1769.5? ^a 7	(6+)				O	E(level): level is suspect since the two γ rays at 1089 and 1440 are associated with the decay of 1769, (6)- level.
1809.64 ^h 7	5-		C	GH	no	J π : γ to 6+; possible band assignment. XREF: n(1792).
1810.85 ^b 4	(6)-		C	GH	no	J π : M1 γ to 4-; M1 γ from 6-.
1813.4 3					Mno	XREF: n(1792).
1829.53 ⁱ 3	6-		C	GH	O	J π : log $ft=7.4$ from 7+; E2 γ to 4-.
1833.1? 6					M	
1855.98 5	(2+)		D		Mno	XREF: M(1856.2).
1856.9 5	1				Mno	J π : γ s to 0+ and 4+.
1871.17 15	1-		D		M	XREF: M(1856.9).
1887.84 21					M O	J π : γ s to 0+ and 2+; $\gamma(0)$ in (n,n' γ).
1917.05 ^f 5	7-		C	GH	O	J π : E1 γ to 0+.
1918.6 4	(2+ to 4+)				MNO	XREF: O(1916).
1959.35 16	(2+)				M O	J π : $\Delta J=2$, E2 γ to 5-; γ to (6)-; band assignment. XREF: O(1923).
1960.30 ⁱ 3	(7)-		C	GH		J π : γ to 2+; not 0 or 1 from $\gamma(0)$ in (n,n' γ).
1960.78 ^h 7	6-		C	G	M O	XREF: O(1961).
1971.05 ^g 7	(7)+		C	GH	O	J π : $\Delta J=(2)$ γ to 4+; γ to 0+.
1978.36 ^j 4	(7)-		C	GH		J π : log $ft=7.1$ from 7+; $\Delta J=2$, E2 γ s to 5-.
1981.82 25					MNO	J π : M1 γ to 5-; log $ft=8.0$ from 7+; possible band assignment.
1993.68 ^b 10	(7-)			GH		XREF: O(1966).
2016.8 8	(2, 3, 4)+				M O	J π : log $ft=8.2$ from 7+; M1+E2 γ to 6+; band assignment.
2023.57 3	3-		D		Mn	J π : log $ft=7.0$ from 7+; M1+E2 γ to (6)-; band assignment.
2057.39 5	1+		D		MnO	XREF: O(1985).
2071					O	J π : $\Delta J=2$ γ to 5-; band assignment.
2087.43 ^f 7	8-			GH		J π : L(d,t)=1,3 from 1/2-; possible γ s to 2+ and 4+.
2094 10					O	E(level): 2023 7 level in (d,t) is probably not 2023.57, 3- level.
2109.96 20	(2-, 3-)		D		Mno	J π : M1+E2 γ s to 2- and 4-.
2114.35 ⁱ 5	(8)-		C	GH		J π : $\Delta J=1$ γ to 0+; L(d,t)=1,3 from 1/2- target.
2116.4 3			D		Mno	J π : $\Delta J=2$ γ to (6-); band assignment.
						XREF: o(2117).
						J π : (E2) γ to 4-; (E1+M2) γ to 2+.
						J π : E2 γ to (6)-; log $ft=8.2$ from 7+; band assignment.
						XREF: o(2117).
						J π : 0+ to 4+ from γ to 2+.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}W Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF		T _{1/2}	Comments
2120.25 ^k 7	(8-)	C	GH		J π : (M1) γ to (7)-; probable bandhead of a 2-q β band.
2131.3 ^h 3	(7-)		GH	O	J π : γ to (6)-; possible band assignment.
2143.0 10				M o	
2147.95 17	(3-)	D		Mn o	J π : (E1) γ to 4+; (E1+M2) γ to 2+.
2173.5 3	(0+ to 4+)	D		Mn o	XREF: o(2175).
					J π : γ to 2+. If 2174 γ to 0+ exists, then J π =1,2+.
2180.4 ^a 8	(8+)			O	J π : γ s to 8+ and 6+; band assignment.
2184.04 4	(2-, 3-)	D		Mn o	XREF: o(2175).
					J π : (M1) γ s to 2- and 3-.
2204.54 ^j 6	(8-)	C	GH		J π : M1+E2 γ to (7)-, log ft=7.5 from 7+.
2207.21 16	(3-)	D		Mn o	J π : (E3) γ to 0+ and (E1+M2) γ to 4+.
2209.07 17	3-	D		Mn o	XREF: O(2217).
					J π : E1 γ to 4+, log ft=8.3 from 2+.
2212.50 ^g 11	(8+)		GH		J π : $\Delta J=1$ γ to (7)+; band assignment.
2225.35 ^b 11	(8-)		GH		J π : $\Delta J=2$ γ to (6)-, band assignment.
2230.65 ^c 14	(10+)	FGH		1.3 μ s 1	%IT=100.
					J π : (M1) γ to 10+; γ to 8+; probable bandhead of a 2-q β band.
					T _{1/2} : from $\gamma(t)$; average of 1.2 μ s 1 in $^{9}\text{Be}(^{208}\text{Pb},\text{X})$ and 1.4 μ s 1 in ($\alpha,2n\gamma$).
2240.83 15	(3+)	D		MNO	J π : (M1) γ s to 2+ and 4+.
2273.87 ^f 8	9-		GH		J π : $\Delta J=2$ γ to (7)-; γ to (8-); band assignment.
2274.63 4	(3-)	D		Mn o	XREF: O(2270).
					J π : E1 γ to 2+; (M1) γ to 4-.
2283.5 6	1			Mn o	XREF: O(2284).
					J π : 2283 $\gamma(6)$ in (n,n' γ).
2301.56 ⁱ 8	(9-)		G		J π : γ s to (7)- and (8-); band assignment.
2316.1 22	(1, 2+)	D		nO	XREF: O(2311).
					J π : γ to 0+.
2323.85 ^h 21	(8-)		GH		J π : γ to (7)-; possible band assignment.
2327.91 ^k 10	(9-)		H		J π : $\Delta J=1$, (M1+E2) γ to (8-); band assignment.
2328				O	
2331 10				O	
2334.26 21			H		J π : (7,8,9) from γ to (7)-.
2360 8				O	
2372.59 [@] 17	12+	FGH		O	J π : $\Delta J=2$, E2 γ to 10+; band assignment.
					T _{1/2} : from B(E2) in Coulomb excitation from 10+ level.
2376				O	
2382.1 7	1		K	NO	J π : from $\gamma\gamma(6)$.
					B(M1)($\uparrow$)=0.46 6. B(E1)($\uparrow$)=5.0 $\times 10^{-5}$ 7.
2395 8				O	
2427 8				O	E(level): multiplet.
2445.98 ^b 15	(9-)		GH		J π : $\Delta J=2$ γ to (7-), band assignment.
2452.7 20				O	
2455.74 ^j 12	(9-)		GH		J π : $\Delta J=1$ γ to (8-); γ to (7)-; band assignment.
2474.1 7	1 [#]		K	NO	J π : from $\gamma\gamma(6)$.
					B(M1)($\uparrow$)=0.31 5. B(E1)($\uparrow$)=3.5 $\times 10^{-5}$ 5.
2479.83 ^g 13	(9+)		GH		J π : $\Delta J=1$ γ to (8+); γ to (7+); band assignment.
2486.89 ^f 10	10-		GH		J π : $\Delta J=2$ γ to (8-); γ to (9-); band assignment.
2492 8				O	
2492.78 ^c 17	(11+)	FGH			J π : $\Delta J=1$ γ to (10+); band assignment.
2507.48 ⁱ 9	(10-)	G			J π : γ s to (8)- and (9-); band assignment.
2520 10	0+			nO	J π : L(p,t)=0.
2552 10	0+			nO	J π : L(p,t)=0.
2563.94 ^k 12	(10-)		GH		J π : γ to (9-); band assignment.
2610 10				NO	XREF: O(2625).
2689 10				O	
2710.93 ^f 11	11-		GH		J π : $\Delta J=2$ γ to (9-); γ to (10-); band assignment.
2725 10	0+			NO	XREF: N(2690).
					J π : L(p,t)=0.
2730.84 ^j 16	(10-)		GH		J π : $\Delta J=1$ γ to (9-); band assignment.
2739.15 ^b 15	(10-)		GH		J π : $\Delta J=2$ γ to (8-); band assignment.
2741.66 ⁱ 12	(11-)	G			J π : $\Delta J=2$ γ to (9-); band assignment.

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Adopted Levels, Gammas (continued)

¹⁸²W Levels (continued)

E(level) [†]	Jπ [‡]	XREF	T _{1/2}	Comments
2769.27 ^g 16	(10+)	GH		Jπ: ΔJ=1 γ to (11+); γ to (10+); band assignment.
2775 10			NO	
2775.65 ^c 18	(12+)	FGH		Jπ: ΔJ=2 γ to (10+); ΔJ=1 γ to (11+); band assignment.
2815 10			O	
2823.93 ^k 16	(11-)	GH		Jπ: ΔJ=1 γ to (10-); γ to (9-); band assignment.
2884.1 7	1 [#]	K	16 fs § 2	Jπ: from γγ(0). B(M1)(↑)=0.22 3. B(E1)(↑)=2.4×10 ⁻⁵ 3.
2892.1 7	(1)	K	27 fs § 17	Jπ: from γγ(0). B(M1)(↑)=0.07 4. B(E1)(↑)=0.8×10 ⁻⁵ 5.
2941.0 20	(1,2+)	K		Jπ: γ to 0+.
2972.49 ^f 13	12-	G		Jπ: ΔJ=2 γ to (10-); γ to (11-); band assignment.
2980.58 ^b 18	(11-)	GH		Jπ: ΔJ=2 γ to (9-); band assignment.
2981.33 ⁱ 12	(12-)	G		Jπ: γ to (10-); band assignment.
2996.1 7	1	K	6.7 fs § 13	Jπ: from γγ(0). Possible K=0 assigned by 1993He15. B(M1)(↑)=0.25 5. B(E1)(↑)=2.7×10 ⁻⁵ 5.
3027.94 ^j 19	(11-)	GH		Jπ: ΔJ=(1) γ to (10-); γ to (9-); band assignment.
3078.25 ^c 19	(13+)	FGH		Jπ: ΔJ=1 γ to (12+); ΔJ=2 γ to (11+); band assignment.
3080.1 7	1 [#]	K	17 fs § 3	Jπ: from γγ(0). B(M1)(↑)=0.15 3. B(E1)(↑)=1.6×10 ⁻⁵ 3.
3106.72 ^k 18	(12-)	GH		Jπ: ΔJ=(1) γ to (11-); γ to (10-); band assignment.
3112.89 [@] 20	14+	FGH	O	Jπ: ΔJ=2, (E2) γ to 12+; band assignment. T _{1/2} : from B(E2) in Coul. ex. from 12+.
3163.1 7	1 [#]	K	10.3 fs § 14	Jπ: from γγ(0). B(M1)(↑)=0.24 3. B(E1)(↑)=2.6×10 ⁻⁵ 4.
3198.1 7	(1,2+) [#]	K	16 fs § 3	Jπ: (γ,γ') excitation from 0+. B(M1)(↑)=0.14 3. B(E1)(↑)=1.5×10 ⁻⁵ 3.
3224.53 ^f 15	13-	G		Jπ: ΔJ=2 γ to (11-); band assignment.
3269.56 ⁱ 16	(13-)	G		Jπ: ΔJ=2 γ to (11-); band assignment.
3319.7 ^b 5	(12-)	G		Jπ: γ to (10-); band assignment.
3343.05 ^j 21	(12-)	G		Jπ: ΔJ=(1) γ to (11-); γ to (10-); band assignment.
3365.1 7	1 [#]	K	11.1 fs § 23	Jπ: from γγ(0). B(M1)(↑)=0.17 4. B(E1)(↑)=1.9×10 ⁻⁵ 4.
3398.35 ^c 19	(14+)	FGH		Jπ: ΔJ=2 γ to (12+); ΔJ=1 γ to (13+); band assignment.
3410.54 ^k 20	(13-)	G		Jπ: γs to (11-) and (12-); band assignment.
3415.92 ⁿ 19	(12)	G		Jπ: ΔJ=1 γ to (11+); band assignment.
3422.1 7	(1,2+) [#]	K	10.3 fs § 20	Jπ: (γ,γ') excitation from 0+. B(M1)(↑)=0.19 3. B(E1)(↑)=2.1×10 ⁻⁵ 4.
3518.04 ⁱ 15	(14-)	G		Jπ: γ to (12-); band assignment.
3549.99 ^f 17	14-	G		Jπ: ΔJ=2 γ to (12-); band assignment.
3567.8 ^b 4	(13-)	G		Jπ: ΔJ=(2) γ to (11-); band assignment.
3601.1 7	1 [#]	K	6.2 fs § 12	Jπ: from γγ(0). B(M1)(↑)=0.23 4. B(E1)(↑)=2.5×10 ⁻⁵ 5.
3640.0 20	(1,2+)	K		Jπ: γ to 0+.
3677.15 ⁿ 21	(13)	G		Jπ: γ to (12+); band assignment.
3727.1 15	(1,2+)	K		Jπ: γ to 0+.
3733.85 ^k 23	(14-)	G		Jπ: γs to (12-) and (13-); band assignment.
3736.40 ^c 20	(15+)	FGH		Jπ: γs to (13+) and (14+); band assignment.
3754.89 ^l 21	(15+)	FG	37 ns 2	Jπ: ΔJ=2, (E2) γ to (13+); ΔJ=1 γ to (14+); bandhead of configuration=((v 9/2+[624])(v 7/2-[503])8-)+(π 9/2-[514])(π 5/2+[402])7-). Other possible configuration from coupling of Kπ=10+ neutrons to Kπ=5+ protons: π9/2[514]+π1/2[541] is less likely. T _{1/2} : from γγ(t) in (¹³ C,α3nγ). Other: 54 ns 10 in (⁹ Be,3nγ).
3807.63 ^f 18	15-	G		Jπ: ΔJ=2 γ to (13-); band assignment.
3880.06 ⁱ 19	(15-)	G		Jπ: ΔJ=2 γ to (13-); band assignment.
3882.0 20	(1,2+)	K		Jπ: γ to 0+.
3893.69 ^d 23	(16+)	FG	≤7 ns	Jπ: (M1) γ to (15+); probable bandhead of a 4-qp band. T _{1/2} : from γγ(t) in (⁹ Be,3nγ).
3910.09 [@] 22	16+	FG	O	T _{1/2} : from B(E2) in Coul. ex. from 14+.
3920.0 20	1	K		Jπ: ΔJ=2, E2 γ to 14+; band assignment.
3966.25 ⁿ 23	(14)	G		Jπ: from γγ(0). Jπ: γs to (12) and (13); band assignment.

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Adopted Levels, Gammas (continued) ^{182}W Levels (continued)

E(level) [†]	J π [‡]	XREF	T _{1/2}	Comments
4040.6 ^e 3	(17-)	FG	20 ns 1	J π : (E1) γ to (16+); probable bandhead of a 4-qp band. T _{1/2} : from $\gamma\gamma(t)$ in ($^{13}\text{C}, \alpha 3n\gamma$). Other: 17 ns 7 in ($^9\text{Be}, 3n\gamma$).
4074.8 ^k 3	(15-)	G		J π : γ s to (13-) and (14-); band assignment.
4078.8 ^g 23	(16+)	G		J π : γ to (15+); band assignment.
4081.5 ^c 3	(16+)	G		J π : γ s to (14+) and (15+); band assignment.
4116.9 ⁱ 3	(16-)	G		J π : γ to (14-); band assignment.
4197.1 ^b 4	(15-)	G		J π : γ s to (13-); band assignment.
4211.1 ^f 3	16-	G		J π : $\Delta J=2$ γ to (14-); band assignment.
4218.1 5	(17+)	F		J π : γ to (16+).
4280.2 ⁿ 3	(15)	G		J π : γ s to (13) and (14); band assignment.
4293.1 ^d 3	(17+)	G		J π : γ to (16+); band assignment.
4421.5 ^e 3	(18-)	FG		J π : γ to (17-); band assignment.
4430.5 ^l 3	(17+)	G		J π : γ s to (15+) and (16+); band assignment.
4453.3 ^c 8	(17+)	G		J π : γ s to (15+) and (16+); band assignment.
4456.2 ^f 3	17-	G		J π : $\Delta J=2$ γ to (15-); band assignment.
4569.7 6	(18+)	F		J π : γ s to (16+) and (17+); band assignment.
4570.9 ⁱ 4	(17-)	G		J π : γ to (15-); band assignment.
4690.8 ^g 25	18+	G		J π : $\Delta J=2$ γ to 16+; band assignment.
4711.9 ^d 3	(18+)	G		J π : γ s to (16+) and (17+); band assignment.
4748.0 10	(18+)	F	O 0.088 ps +22-17	E(level): this level also seems connected with g.s. band. T _{1/2} : from B(E2) in Coul. ex.
4779.6 ⁱ 4	(18-)	G		J π : γ to (16+); Coulomb excited.
4780.4 ^m 4	(18)	FG		J π : γ to (16-); band assignment.
				J π : γ to (17-); possible configuration=((v 9/2+[624])(v 11/2+[615])10+)+ ((π 9/2-[514])(π 7/2+[404]))8-.
4804.9 ^l 3	(18+)	G		J π : γ s to (16+) and (17+); band assignment.
4820.1 ^e 3	(19-)	FG		J π : γ s to (17-) and (18-); band assignment.
4847.4 ^c 8	(18+)	G		J π : γ to 16+; band assignment.
4954.8 ^f 11	18-	G		J π : γ to (16-); band assignment.
5148.6 ^d 5	(19+)	G		J π : γ s to (17+) and (18+); band assignment.
5170.8 4	19-	G	O	J π : γ to (17-); band assignment.
5191.8 ^m 4	(19)	G		J π : γ to (18); band assignment.
5199.6 ^l 4	(19+)	G		J π : γ to (18+); band assignment.
5225.4 ^c 13	(19+)	G		J π : γ to (17+); band assignment.
5235.8 ^e 4	(20-)	FG		J π : γ s to (18-) and (19-); band assignment.
5338.6 ⁱ 11	(19-)	G		J π : γ to (17-); band assignment.
5428.6 ^g 4	20+	G		J π : γ to 18+; band assignment.
5618.6 ^m 4	(20)	G		J π : γ s to (18) and (19); band assignment.
5666.9 ^e 8	(21-)	G		J π : γ s to (19-) and (20-); band assignment.

[†] From least-squares fit to E γ data; normalized $\chi^2=0.68$.[‡] For high-spin ($J>6$) states, ascending spins are assumed with the rise in excitation energy, as expected from yrast type of population of levels in in-beam, heavy-ion γ -ray studies. The transitions involving $\Delta J=2$ from angular distributions are generally treated as E2 from RUL and those with $\Delta J=1$ and significant D+Q admixtures as M1+E2.[§] Deduced from $\Gamma_{\gamma 0}$ and branching ratio given by 1993He15.

K=1 assigned by 1993He15 from comparison of reduced transition probabilities with Alaga's rules.

@ (A): K $\pi=0+$, g.s. band. Backbending at $\hbar\omega=0.38$ MeV.& (B): K $\pi=0+$ band. 2001Ga02, in analysis of β vibration and second 0+ states, suggest that excited 0+ band in ^{182}W is not a β -vibration.a (C): K $\pi=2+$, γ band.b (D): K $\pi=2-$, octupole band.c (E): K $\pi=10+$, v9/2[624] $\otimes$ v11/2[615]. (g_K-g_R)=0.34 4 (1994Re03), $g_K(\text{exp})=-0.15$ 2.d (F): K $\pi=(16+)$, 4-qp band. v²(8-): v9/2[624] $\otimes$ v7/2[503]; $\pi^2(8-)$: $\pi 9/2[514]\otimes\pi 7/2[404]$. (g_K-g_R)=0.21 19 (1994Re03), $g_K(\text{exp})=+0.36$ 6. Configuration=(v9/2+[624])(v11/2+[615])10+)+($\pi 7/2+[404]$) ($\pi 5/2+[402]$)6+ is also proposed by 1994Re03. For K $\pi=8-$ neutron configuration, 7/2[514] orbital is excluded by the comparison of experimental g_K and corresponding theoretical value.e (G): K $\pi=(17-)$, 4-qp band. v²(10+):v9/2[624] $\otimes$ v11/2[615]; $\pi^2(7-)$: $\pi 9/2[514]\otimes\pi 5/2[402]$. (g_K-g_R)=0.30 7, 0.18 7 (1994Re03), $g_K(\text{exp})=+0.46$ 3.f (H): K $\pi=4-$, v9/2[624] $\otimes$ v1/2[510]. $g_K(\text{exp})=+0.05$ 4.g (I): K $\pi=6+$, $\pi 5/2[402]\otimes\pi 7/2[404]$. $g_K(\text{exp})=+1.11$ 5.h (J): K $\pi=5-$, v9/2[624] $\otimes$ v1/2[510].

Footnotes continued on next page

Adopted Levels, Gammas (continued) ^{182}W Levels (continued)

- i (K): $K\pi=6-, \nu 9/2[624] \otimes \nu 3/2[512]$. $g_K(\text{exp})=+0.01$ 1.
j (L): $K\pi=7-, \pi 9/2[514] \otimes \pi 5/2[402]$. $g_K(\text{exp})=+1.17$ 7.
k (M): $K\pi=8-, \nu 9/2[624] \otimes \nu 7/2[503]$. $g_K(\text{exp})=-0.21$ 5 excludes 7/2[514] neutron orbital when compared with theoretical value.
l (N): $K\pi=15+, 4\text{-qp}$ band. $\nu^2(8-)$: $\nu 9/2[624] \otimes \nu 7/2[503]$; $\pi^2(7-)$: $\pi 9/2[514] \otimes \pi 5/2[402]$. $g_K(\text{exp})=+0.52$ 4. For $K\pi=8-$ neutron configuration, 7/2[514] orbital is excluded by the comparison of experimental g_K and corresponding theoretical value.
m (O): $K\pi=18-, \nu^2_{(10+)} \otimes \pi^2_{(8-)}$. $\nu^2(10+)$: $\nu 9/2[624] \otimes \nu 11/2[615]$; $\pi^2(8-)$: $\pi 9/2[514] \otimes \pi 7/2[404]$. $g_K(\text{exp})=+0.32$.
n (P): $K=(12)$ band.

 $\gamma(^{182}\text{W})$

$q_K(\text{E0/E2})$ =ratios of K-conversion intensities of E0 and E2 transitions.

E(level)	$E\gamma^\dagger$	$I\gamma^\dagger$	Mult. [‡]	$\delta^\ddagger$	$\alpha^\#$	I(γ +ce)	Comments
100.10598	100.10595 [§] 7	100	E2		3.89		B(E2)(W.u.)=136.1 18.
329.4268	229.3207 [§] 6	100	E2		0.196		B(E2)(W.u.)=196 10.
680.42	351.02 6	100	E2		0.0538		B(E2)(W.u.)=201 22.
1135.82	1035.65 12	100 33	[E2]		0.00420		
	1135.9 2		E0			0.84 21	$q_K^2(\text{E0/E2})=1.8$ 7, X(E0/E2)=0.09 4 (2005Ki02 evaluation).
1144.32	463.9 1	100	E2		0.0254		B(E2)(W.u.)=209 18.
1221.4001	891.77 10	0.163 7	E2		0.00569		B(E2)(W.u.)=0.0346 18.
	1121.290 3	100.0	E2+M1+E0	+30 +6-4			Mult.: E0 component suggested by ce data in ^{182}Ta β^- (1990Ka35) and $q_K(\text{E0/E2})=0.19$ 6 (1975We22). δ : 17 +4-3 (1990Ka35).
	1221.395 3	77.27 22	E2		0.00305		B(E2)(W.u.)=6.74 17.
1257.4121	(121.5 2)	0.16 4	[E2]		1.83		B(E2)(W.u.)=3.40 9. E γ : B(E2)(W.u.)=200 60 is considered as large and improbable by the evaluators in view of relatively small B(E2)(W.u.) for other transitions from the 1257 level. Thus the presence of this transition is treated as questionable.
	928.00 3	40.5 6	E2		0.00524		B(E2)(W.u.)=180 50. $\delta(\text{M3/E2})=+0.04$ 14 ($\gamma\gamma(\theta)$ in ^{182}Ta β^- , 1992Ch26). B(E2)(W.u.)=1.73 15.

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
1257.4121	1157.3 1	42 6	E2+M1+E0	-9 +3-6	0.0092 5	Eγ: from ^{182}Re decay (64.0 h). In β^- decay, 1157+1158 doublet is not well resolved; with average energy of the doublet at 1157.510 15, it deviates from level-energy difference by 0.2 keV in β^- decay dataset. Iγ: unweighted average of 48.6 23 (β^- decay) and 35 4 in ϵ decay (64 h). Other: 72 5 in Coul. ex. is high by $\approx 70\%$. Values from ($\alpha, 2n\gamma$) and ($n, n'\gamma$) cannot be used as these studies did not account for 1157 being a doublet with the second component from 1487 level. Mult.: E0 component is estimated as 0.5% 1 by the evaluators from comparison of γ-ray intensities and K-shell electron conversion data in 1976He18. α: based on 0.5% 1 E0 component and $\delta(\text{E2/M1})=-9 +3-6$. B(E2)(W.u.)=0.59 10. B(E2)(W.u.)=0.93 8. Iγ: all branchings relative to 1189γ, since efficiency problems at low energies such as 67.7 keV can be problematic. Branching for 31.7γ is from β^- decay. Other: 2.8 6 from ϵ decay is low by a factor of ≈ 2. B(E1)(W.u.)=7.1×10^{-5} 4. Mult., δ: RUL(M2)=1 implies $\delta < 0.002$, thus pure E1 is assigned. Experimental limit: $\delta < 0.02$. B(E1)(W.u.)=0.000360 14. δ: other: -4.6 +36-Inf ($\gamma\gamma(0)$ in ^{182}Ta β^-, 1992Ch26). B(M2)(W.u.)=0.00016 11; B(E3)(W.u.)=3.44 16.
1289.1498	1257.407 3 31.7377 5	100.00 28 5.30 13	E2 E1		0.00289 1.628	
	67.74970 § 10	260.4 21	E1		0.202	
	959.73 3	2.120 24	E3+M2	-5.5 +19-10	0.0116 7	

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
1289.1498	1189.040 3	100.00 24	E1+M2+E3		0.0047 3	$\delta(\text{M2/E1})=+0.48$ 3; $\delta(\text{E3/E1})=-0.67$ 5. B(E1)(W.u.)= 1.58×10^{-8} 13; B(M2)(W.u.)=0.012 2; B(E3)(W.u.)=10.6 13. δ : from weighted averages of $\delta(\text{M2/E1})=+0.44$ 6, $\delta(\text{E3/E1})=-0.69$ 10 (1983Ri05); $\delta(\text{M2/E1})=+0.49$ 3, $\delta(\text{E3/E1})=-0.64$ 5 (1972Kr05); $\delta(\text{M2/E1})=0.49$ 3, $\delta(\text{E3/E1})=0.72$ 7 (1972He10). Mult., α : 59% 4 E1, 14% 1 M2 and 27% 3 E3. Conversion coefficient deduced for this admixture from BrIcc code.
1331.1153	1289.145 3 1001.700 18	8.32 4 17.95 21	M2 E2+M1	-8.9 +18-21	0.01231 0.00455 8	B(M2)(W.u.)=0.00460 17. δ : other: -8.2 +22-42 ($\gamma\gamma(0)$ in ^{182}Ta β^- , 1992Ch26). B(M1)(W.u.) $>4.1 \times 10^{-8}$; B(E2)(W.u.) >0.0023 . B(M1)(W.u.) $>9.7 \times 10^{-9}$; B(E2)(W.u.) >0.0046 . δ : others: +11 +6-3 ($\gamma\gamma(0)$ in ^{182}Ta β^- , 1992Ch26); -60 +20-100 (1972Kr05). B(E1)(W.u.)=0.00028 4.
	1231.004 3	100.00 24	E2+M1	-33 +6-9	0.00301	δ : others: +11 +6-3 ($\gamma\gamma(0)$ in ^{182}Ta β^- , 1992Ch26); -60 +20-100 (1972Kr05). B(E1)(W.u.)=0.00028 4.
1373.8301	42.7148 4 84.6802 $\S$ 3	3.82 8 37.82 25	E1 M1+E2	+0.326 11	0.720 7.66	δ : weighted average of +0.32 3 (1983Ri05), +0.30 2 (1980Sp01), +0.31 5 (1975Qu01), +0.30 2 (1972Kr05), 0.352 3 (1972He10,ce data, uncertainty increased to 0.02 in averaging procedure), 0.40 7 (1971Ga37,ce data), 0.346 7 (1967Ni03, ce data, uncertainty increased to 0.02 in averaging procedure). Values with sign are from $\gamma(0)$ or $\gamma\gamma(0)$ data. B(M1)(W.u.)=0.034 5; B(E2)(W.u.)=210 30. B(E1)(W.u.)= 2.3×10^{-5} 3. δ : -0.22 11 (1992Ch26), -0.023 4 (1983Ri05), 0.035 53 (1980Sp01 in ^{182}Re decay); +0.014 13 (1975Qu01); all from $\gamma(0)$ or $\gamma\gamma(0)$. Subshell ratios in ce data (1967Ni03) give pure E1 consistent with RUL(M2)=1 suggests $\delta < 0.006$, thus the evaluators assign pure E1. B(E1)(W.u.)=0.000162 21. $\delta(\text{M2/E1})=+0.4$ 3, $\delta(\text{E3/E1})=-0.3$ 2 (1972Kr05). B(E1)(W.u.)= 1.42×10^{-8} 21; B(M2)(W.u.)=(0.013 5).
	116.4179 $\S$ 6 152.42991 $\S$ 26	6.33 5 100.0 5	E1 E1		0.253 0.1258	
	1044.42 5	3.41 6	E1+M2 (+E3)	0.46 9	0.0051 12	

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
1373.8301	1273.719 3	9.40 5	E1+M2+E3		0.0029 5	$\delta(\text{M2/E1})=+0.36$ 10; $\delta(\text{E3/E1})=-0.28$ 12. Mult., α : 81% 5 E1, 12% 4 M2 and 7% 2 E3. Conversion coefficient deduced for this admixture from BrIcc code. Mult., δ : from $\gamma(\theta)$ and lin pol data of 1983Ri05, agrees with ce data of 1992Ch26. $\text{B(E1)(W.u.)}=1.37\times 10^{-8}$ 20; $\text{B(M2)(W.u.)}=8\times 10^{-4}$; $\text{B(E3)(W.u.)}=9$ 2.
1442.835	1373.824 3 1113.410 18	3.17 3 100.0 14	E3 E2+M1(+E0)	+5.6 +13-10	0.00496 0.00376 8	$\text{B(E3)(W.u.)}=5.8$ 8. Mult., δ : from ce data in ^{182}Ta β^- , 1990Ka35 suggest M1+E2(+E0) with $\delta(\text{E2/M1})=20$ 13. $\delta(\text{E2/M1})=+1.1$ 2 from $\gamma\gamma(\theta)$ in ^{182}Ta β^- (1992Ch26). E0 component is suggested by 1975We22 with $q_K(\text{E0/E2})=0.41$ 9. $\text{B(E2)(W.u.)}=10.3$ 10. $I\gamma$: 93 7 in ($\alpha,2n\gamma$) is high by $\approx 60\%$. $\delta(\text{M3/E2})=-0.11$ +4-20 from $\gamma(\theta)$ in ^{182}Ta β^- decay is inconsistent with $\text{RUL(M3)}=10$, which suggests that δ should be near zero. $\alpha(\text{K})_{\text{exp}}$ in ^{182}Re ε decay is consistent with $\delta(\text{M3/E2})=0$ assigned by the evaluators. $\text{B(E2)(W.u.)}=2.41$ 23. $\text{B(E1)(W.u.)}>0.00011$. $I\gamma$: 122 10 in ($\alpha,2n\gamma$) is high by $\approx 75\%$. $\text{B(M1)(W.u.)}>0.038$; $\text{B(E2)(W.u.)}>150$. $\delta(\text{M2/E1})=-0.053$ 4 (1983Ri05, $\gamma(\theta)$ and lin pol); -0.08 5 (1992Ch26, $\gamma\gamma(\theta)$); $+0.06$ +3-6 (1981Ka22, $\gamma\gamma(\theta)$). But $\text{RUL}=1$ for M2 implies $\delta<0.005$, thus the evaluators assign E1. $\delta(\text{M2/E1})=-0.08$ 5 ($\gamma\gamma(\theta)$ and ce in ^{182}Ta β^- , 1992Ch26). $\text{B(E1)(W.u.)}>0.00023$. $\delta(\text{M3/E2})=+0.067$ 10 from $\gamma(\theta)$ in ^{182}Ta β^- , but $\text{RUL(M3)}=10$ suggests $\delta(\text{M3/E2})$ should be near zero. The evaluators assign pure E2. $\text{B(E2)(W.u.)}>68$. $\delta(\text{M2/E1})=-0.01$ +2-1 ($\gamma\gamma(\theta)$ in ^{182}Ta β^- , 1992Ch26). $I\gamma$: from ^{182}Re decay (64.0 h). $\text{B(E1)(W.u.)}>6.1\times 10^{-8}$.
	1342.730 15	57.7 3	E2		0.00256	
1487.5018	44.66@ 11 113.67170 $\S$ 22	1.12 22 70.0 3	[E1] M1+E2	+0.36 1	0.637 10 3.18	
	156.3864 $\S$ 3	100.0 4	E1		0.1177	
	198.35187 $\S$ 29	54.84 21	E2		0.317	
	1158.1 2	10.8 13	E1		1.38×10^{-3}	

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
1487.5018	1387.390 3	2.73 4	E3+M2	2.6 4	0.00554 24	B(M2)(W.u.)>0.0020; B(E3)(W.u.)>5.9.
1510.22	830.1 4	17 3				$E\gamma, I\gamma$: weighted averages taken of data from β^- , ϵ and (n,n' γ) for all three γ rays from the 1510 level.
	1180.80 11	100 3	E2+M1	-2.8 10	0.0036 4	
	1410.13 5	45.8 10	E2		0.00235	
1553.2240	65.72215 § 15	39.8 4	M1+E2	0.093 6	2.91 5	B(M1)(W.u.)=0.00624 24; B(E2)(W.u.)=5.2 7.
	110.393 12	1.42 4	[E1]		0.290	B(E1)(W.u.)=4.53 $\times 10^{-7}$ 20.
	179.39381 § 25	41.22 19	M1+E2	+1.3 2	0.62 4	$I\gamma$: 35.5 21 from ϵ decay is quite in agreement. δ : unweighted average of +2.2 2 (1992Ch26), +2.1 +3-2 (1983Ri05), +1.3 5 (1980Sp01), +0.9 4 (1975Qu01), +0.92 +13-7 (1972Kr05), +0.90m +40-23 (1972He10), 0.7 1 (1967Ni03). Weighted average is 1.0 2 but with reduced $\chi^2=10$. Except for 1967Ni03, all other methods are $\gamma(\theta)$ on oriented nuclei or $\gamma\gamma(\theta)$.
	222.1085 § 3	100.0 3	E1		0.0480	B(M1)(W.u.)=0.000119 24; B(E2)(W.u.)=2.6 4. δ : +0.007 5 (1972Kr05), +0.027 7 (1992Ch26), -0.12 18 (1975Qu01), pure E1 from subshell data (1967Ni01), as also suggested by RUL for M2.
	264.0740 § 3	47.74 19	E2		0.1254	B(E1)(W.u.)=3.92 $\times 10^{-6}$ 13.
	1223.73 11	3.1 4	E1+M2 (+E3)	-0.15 +10-25	0.0016 15	B(E2)(W.u.)=0.700 23. $E\gamma$: weighted average from β^- and ϵ decay. Mult., δ : from ce data of 1976He18 and $\gamma\gamma(\theta)$ data of of 1992Ch26 in ^{182}Ta β^- . E3 admixture cannot be ruled out.
	1453.120 6	0.405 14	E3 (+M2)	>2.3	0.0048 4	B(E1)(W.u.)=7.1 $\times 10^{-10}$ 10; B(M2)(W.u.)=(5. $\times 10^{-5}$ +7-5). B(E3)(W.u.)=0.017 2. $I\gamma$: other: 27 3 in ($\alpha, 2n\gamma$) is much higher, most likely an impurity or incorrect assignment.
1621.284	111.07 5	4.1 3				
	133.80 5	49 3	M1+E2	+0.39 +4-3	1.96 4	
	178.47 5	45 3	E1		0.0838	
	247.46 5	100 7	E2		0.1538	
	1291.8 4	4.6 5	E1+M2	0.4 2	0.0027 14	
	1521.3 4	1.89 20	(E3)		0.00402	
1623.51	943.1 3	14.0 22	E2		0.00507	$I\gamma$: 35 5 in (n,n' γ) is discrepant.
	1294.0 3	100.0 19	E2 (+M1)	>30	0.00274	
1660.383	39.1 1	3.7 7	M1+E2	0.061 7	13.6 4	
	107.13 5	20.1 15	M1+E2	-0.8 2	3.54 13	$I\gamma$: 55 4 in ($\alpha, 2n\gamma$) is discrepant.

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
1660.383	150.25@ 5	7.3 7	(E1)		0.1305	$I\gamma$: 51 10 in ($\alpha, 2n\gamma$) is discrepant.
	172.87 5	51 3	M1+E2	+0.26 1	0.971	$I\gamma$: 137 14 in ($\alpha, 2n\gamma$) is discrepant.
	217.55 5	46 3	(E1)		0.0506	$I\gamma$: 93 7 in ($\alpha, 2n\gamma$) is discrepant.
	286.56 5	100 7	E2		0.0976	
	1330.9 2	5.3 5	E1+M2	0.5 2	0.0032 14	
	1560.4 4	1.02 11	(E3)		0.00382	
1711.99	567.5 1	100	E2		0.01543	B(E2)(W.u.)=203 19.
1756.75	313.94 12	7.5 5	E2		0.0743	
	1076.4 1	100 3	E2+M1	+2.56 +9-8	0.00444	Mult.: no E0 admixture was found in $\gamma(\text{ce})(\theta)$ and ce data of 1975We22.
	1427.2 1	92.1 17	E2		0.00231	
1765.53	434.3 2	48 12				
	544.20 15	100 15				
1768.943	108.58 5	12.6 25	M1+E2	-0.6 2	3.50 13	$I\gamma$: 78 6 in ($\alpha, 2n\gamma$) is discrepant.
	145.43 5	11.8 9	(E1)		0.1420	$I\gamma$: 45 10 in ($\alpha, 2n\gamma$) is discrepant.
	147.71 5	16.2 14	M1+E2	+0.8 2	1.30 9	$I\gamma$: 49 10 in ($\alpha, 2n\gamma$) is discrepant.
	215.72 5	12.3 24	(E2)		0.240	$I\gamma$: 65 6 in ($\alpha, 2n\gamma$) is discrepant.
	281.43 5	100 7	E2		0.1031	
	1088.5 3	3.5 4	E1+M2	0.4 2	0.0040 23	
	1439.3 3	2.81 18	(M2)		0.00930	Mult.: E1+M2 from $\alpha(\text{K})\text{exp}$ but $\Delta J\pi$ requires M2.
1769.5?	1089.0					
	1440.1					
1809.64	188.54@ 5	1.38 14				
	256.42 11	100 8	M1+E2	+0.037 +6-7	0.336	
1810.85	42.0					
	187.34 5	18.4 18	E1+M2	+0.25 +27-20	0.33 66	
	189.60 7	21.8 18	M1+E2	+0.31 +15-12	0.74 4	
	323.33 10	100 7	E2		0.0681	
1813.4	524.2 3	100				
1829.53	19.85 10	0.32 11	M1+E2	0.07 2	130 30	
	60.65 10	0.91 23				
	169.15 10	100 7	M1+E2	+0.094 6	1.060	
	206.00 5	4.5 5	E1		0.0581	
	208.26 5	5.5 5	M1+E2	-1.0 5	0.43 10	
	276.31 5	77 5	E2		0.1090	
	342.03 10	9.3 7	E2		0.0579	$I\gamma$: 43 4 in ($\alpha, 2n\gamma$) is discrepant.
1833.1?	1733.0@ 6	100				
1855.98	598.56 5	100 11				
	1527.0@ 10	10 5				$E\gamma$: from ($n, n'\gamma$) only.
	1756.0 2	15 3				$I\gamma$: 167 40 in ($n, n'\gamma$) is discrepant.
	1857.3 2	8.0 6	(E2)		1.59×10^{-3}	$E\gamma$: from ^{182}Re decay only, poor fit; γ not used in the level-scheme fitting procedure. Level-energy difference=1856.1.
1856.9	1757.0 6	35 12				
	1856.7 6	100 23				
1871.17	1543 2	=5	[E3]		0.00391	
	1771.0 2	100 10	E1		1.04×10^{-3}	
	1871.2 2	90 7	E1		1.06×10^{-3}	
1887.84	556.7 3	83 25				
	666.4 4	46 17				

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
1887.84	1558.5 4	100 25				
1917.05	106.3 1	8 2				
	148.2 1	10 2				
	160.20@ 5					$E\gamma$: from ^{182}Re decay only.
						This γ is considered as suspect by the evaluators since its intensity of 116 7 relative to 100 for 295.7 γ is much too high to have missed detection in in-beam γ -ray study.
	256.5 1	28 4	Q			
	295.63 10	100 14	E2		0.0888	
1918.6	1818.5 4	100				
1959.35	449.8 3	21 10	(Q)			
	627.5 4	50 14				
	1629.8 2	100 14				
	1859.1 8	71 24				
	1959.2@ 10	14 5				
1960.30	130.81 5	100 7	M1+E2	-0.51 +6-8	2.03 6	
	149.45 5	12.1 10	M1+E2	-0.15 +15-18	1.50 6	
	191.39 5	90 7	M1+E2	-0.23 +6-8	0.734 18	
	203.55 5	6.6 7	(E1)		0.0599	From $\gamma(0)$ in ^{182}Re ϵ decay, 1980Sp01 give $\delta(Q/D)=-17 +10-24$ or +0.06 +9-4; favoring the former value from δ based on ce data of 1971Ga37. But 1971Ga37 assigned tentative E2 from their ce data. $\delta(M2/E1)=-17 +10-24$ is inconsistent with $RUL(M2)=1$ for $T_{1/2}(1960.30 \text{ level}) < 1$ ns or so. The evaluators assign tentative E1.
						$I\gamma$: 52 4 in $(\alpha, 2n\gamma)$ is discrepant.
	299.90 10	20 3	E2		0.0851	$I\gamma$: 61 6 in $(\alpha, 2n\gamma)$ is discrepant.
	339.04 10	72 10	E2		0.0594	
1960.78	151.15 5	26 3	M1+E2	0.8 3	1.21 13	
	300.36 10	100 23	M1+E2	+0.048 26	0.218	
	1279.8@ 3	3.6 5				
	1631.4@ 5	0.74 14	M2+E3	≈ 2.5	≈ 0.00396	
1971.05	214.31 5	100	M1+E2	+0.25 +8-7	0.532 15	
1978.36	18.05 10	1.9 5	M1+E2	0.016 5	128 4	
	148.86 5	27.2 20	M1+E2	+0.28 +8-6	1.48 4	
	209.40 5	7.6 8	M1+E2	-0.28 +23-15	0.56 3	$I\gamma$: 33 3 in $(\alpha, 2n\gamma)$ is discrepant.
	221.59 6	100 8	E1		0.0483	
	357.04 10	8.4 8	E2		0.0513	
1981.82	650.7 3	59 18				
	723.8 7	26 9				
	1653.1 8	82 24				
	1881.8 8	100 18				
1993.68	182.8 5	<11				
	372.4 1	100 17	Q			
2016.8	1688.3@ 10	100 33				
	1915.3@ 12	100 33				
2023.57	470.26 5	100 5	M1+E2	0.6 1	0.055 3	
	536.04 5	10.3 16	M1+E2	0.7 2	0.037 4	
	649.73 5	16.8 24	M1+E2	0.8 2	0.0219 23	
	734.53 5	18.7 22	M1+E2	1.0 3	0.0148 22	

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
2057.39	800 1	16 4				
	835.98 5	50 5	(M1+E2)	=0.8	=0.01177	
	1957.4 2	49 3	(M1+E2)	1.0 +6-4	0.00186 17	
	2057.4 3	100 8	D			
2087.43	170.4 1	20 4				
	318.5 1	100 15	Q		0.0716	
2109.96	556.7 3	100 28	(E2)		0.01615	
	2010.1 3	86 12	(E1+M2)	0.9 +7-4	0.00250 85	
	2109.3 5	<235	[M2,E3]		0.00303 80	
2114.35	154.10 5	58 13	M1+E2	0.6 3	1.22 12	
	197.4 2	23 7				
	285.1 10	46 8				
	345.29 15	100 15	E2		0.0564	
2116.4	2016.3 3	100				
2120.25	160.1 1	100 18	(M1)		1.243	
	290.5 1	35 6				
2131.3	362.4 3	100				
2143.0	1813.6@ 10	100				
2147.95	817.0 10	12 4				$E\gamma$: from (n,n' γ) only.
	1818.7 2	92 8	(E1)		1.05×10^{-3}	$I\gamma$: 222 33 in (n,n' γ) is discrepant.
	2047.4 3	100 8	(E1+M2)	1.0 +10-5	0.00258 89	
	2148@ 3	24 5	[E3]		0.00218	
2173.5	952.3 6	42 12				
	2073.3 3	100 23				
	2174@	<23				$E\gamma$: from (n,n' γ) only.
2180.4	1036.0					
	1500.0					
2184.04	810.24 5	18.2 21	(M1)		0.01639	
	894.85 5	100 8	(M1)		0.01276	
	2084.0 3	3.1 3				
2204.54	226.19 5	100	M1+E2	+0.15 2	0.468	
2207.21	1877.6 2	58 18	(E1+M2)	-0.28 6	0.00134 12	
	2106.8 5	<250				
	2207.7 3	100 9	(E3)		0.00209	
2209.07	835.9 6	33 11				$E\gamma$: from (n,n' γ) only.
	1879.6 2	21 6	E1		1.06×10^{-3}	
	2108.9 4	100 17				
	2208.8 6	78 17	[E3]		0.00209	$E\gamma$: from (n,n' γ) only.
2212.50	241.5 1	100 15	D+Q			
	454.9 4	15 5				
2225.35	414.5 1	100	Q			
2230.65	518.5 1	100 13	(M1)		0.0514	B(M1)(W.u.)= 7.0×10^{-8} 13.
	1086.5 1	69 7	[E2]		0.00382	$I\gamma$: 116 13 in (α ,2n γ) is discrepant.
						B(E2)(W.u.)= 1.9×10^{-6} 3.
2240.83	1911.8 2	100 17	(M1)		0.00230	
	2140.3 2	87 15	(M1)		0.00197	
2273.87	186.5 1	16.7 19				
	356.8 1	100 15	Q			
2274.63	787.11 5	86 16	(M1)		0.01763	$I\gamma$: 15 8 in (n,n' γ) is discrepant.
	900.80 5	100 17	(M1+E2)	=0.5	=0.01116	
	2175.2 3	13.2 19	E1		1.14×10^{-3}	
2283.5	909.7 6	64 29				
	2283.5 10	100 29				
2301.56	181.3 10	18 9				
	187.6 3	36 9				
	214.2 10	<27				
	341.3 1	109 46				
	384.4 1	100 18				
2316.1	2216 3	=275				
	2316 3	100 20				

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\alpha^{\#}$	Comments
2323.85	406.8 2	100			
2327.91	207.4 2	73 15	(M1+E2)	0.44 17	
	213.6 1	100 16			
2334.26	355.9 2	100			
2372.59	660.6 1	100	E2	0.01085	B(E2)(W.u.)=191 10.
2382.1	2282 1	142 20			
	2382 1	100			
2445.98	452.3 1	100	Q		
2455.74	251.2 1	100 14	(D+Q)		
	477.1 10	<7			
2474.1	2374 1	66 14			
	2474 1	100			
2479.83	267.3 1	100 18	D+Q		
	508.8 2	29 6			
2486.89	213.0 1	25 3			
	399.5 2	100 19	Q		
2492.78	262.1 1	100	D+Q		
2507.48	205.8 2	30 10			
	233.8 10	<20			
	387.1 2	120 60			
	393.4 2	60 10			
	420.0 1	100 20			
2563.94	236.0 1	100 16			
	443.8 2	<8			
2710.93	224.0 1	24 3			
	437.1 1	100 18	Q		
2730.84	275.1 1	100 14	(D+Q)		
	526.2 10	<14			
2739.15	513.8 1	100	Q		
2741.66	440.1 1	100 18	Q		
	467.7 5	35 6			
2769.27	289.4 1	100	D+Q		
	557.6 5	39 4			
2775.65	282.8 1	100	D+Q		
	545.1 2	18 3	Q		
2823.93	260.0 1	100	D+Q		
	496.0 5	48 5			
2884.1	2784 1	40 11			
	2884 1	100			
2892.1	2792 1	150 90			
	2892 1	100			
2941.0	2941 2	100			
2972.49	261.6 2	20 5			
	485.6 1	100 20	Q		
2980.58	534.6 1	100	Q		
2981.33	473.8 1	100 19			
	494.6 2	38 6			
2996.1	2896 1	168 35			
	2996 1	100			
3027.94	297.1 1	100	(D+Q)		
	575.2 20	24 11			
3078.25	302.5 1	100	D+Q		$I\gamma(586\gamma)/I\gamma(302)=1.6$ 7 in $(\alpha, 2n\gamma)$.
	585.8 2	47 9	Q		
3080.1	2980 1	61 18			
	3080 1	100			
3106.72	282.8 1	100	(D+Q)		
	542.5 5	53 6			
3112.89	740.3 1	100	(E2)	0.00843	B(E2)(W.u.)=170 30.
3163.1	3063 1	54 12			
	3163 1	100			
3198.1	3098 1	59 21			
	3198 1	100			If E2, B(E2)(W.u.)=0.67 $\times 10^{-5}$ 16.
3224.53	513.6 1	100	Q		

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. ‡	$\alpha^{\#}$	Comments
3269.56	527.9 1	100	Q		
3319.7	580.6 4	100			
3343.05	315.1 1	100 14	(D+Q)		
	612.6 10	43 29			
3365.1	3265 1	63 17			
	3365 1	100			
3398.35	320.0 1	100	D+Q		
	622.7 1	61 18	Q		
3410.54	303.8 1	100 13			
	586.8 5	88 13			
3415.92	923.1 1	100	D+Q		
3422.1	3322 1	53 15			
	3422 1	100			If E2, B(E2)(W.u.)=0.76 $\times 10^{-5}$ 17.
3518.04	536.7 1	100 20			
	545.7 5	40 10			
3549.99	568.6 [@] 10	<22			
	577.5 1	100 22	Q		
3567.8	587.2 3	100	(Q)		
3601.1	3501 1	77 19			
	3601 1	100			
3640.0	3640 2				
3677.15	261.2 1	100 14			
	901.8 3	21 7			
3727.1	3627 2				
	3727 2				
3733.85	323.3 1	71 10			
	627.4 5	100 14			
3736.40	338.0 1	100			
	658.2 1	94 20			
3754.89	(19)	=0.2	[M1]	107.1	B(M1)(W.u.)=9.8 $\times 10^{-7}$. I γ : from $\gamma\gamma$ data, I(γ +ce) branching is =10%. B(M1)(W.u.)=13.0 $\times 10^{-6}$ 23. B(E2)(W.u.)=0.00053 15.
	356.5 1	100 17	(M1+E2)	0.095 44	
	676.8 2	57 13	(E2)	0.01028	
3807.63	583.1 1	100	Q		
3880.06	610.5 1	100	Q		
3882.0	3782 [@] 2				
	3882 2				
3893.69	138.8 1	100	(M1)	1.86	B(M1)(W.u.)>0.00041.
3910.09	797.2 1	100	E2	0.00719	B(E2)(W.u.)=200 50.
3920.0	3920 2	100			
3966.25	289.1 1	100 50			
	550.3 10	25 13			
4040.6	146.9 1	100	(E1)	0.1384	B(E1)(W.u.)=2.92 $\times 10^{-6}$ 15.
4074.8	340.9 2	75 25			
	664.2 5	100 25			
4078.89	324.0 1	100			
4081.5	345.1 2	60 20			
	683.2 3	100 40			
4116.9	598.9 2	100			
4197.1	629.3 2	100			
4211.1	661.1 2	100	Q		
4218.1	324.4 5	100			
4280.2	314.0 1	100 67			
	603.1 10	33 17			
4293.1	399.4 1	100			
4421.5	380.9 1	100			
4430.5	351.6 1	100 18			
	675.5 11	18 9			
4453.3	371.3 10	<33			
	717.3 10	100 33			
4456.2	648.6 2	100	Q		
4569.7	351.6 5	100 32			
	676.1 7	24 8			

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{W})$ (continued)

E(level)	$E\gamma^\dagger$	$I\gamma^\dagger$	Mult. ‡	$\alpha^\#$	Comments
4570.9	690.8 3	100			
4690.89	780.8 1	100	Q		
4711.9	418.8 1	100 18			
	818.1 6	64 27			
4748.0	837.9 9	100	[E2]	0.00648	B(E2)(W.u.)=250 +50-70.
4779.6	662.7 2	100			
4780.4	739.8 2	100			
4804.9	374.5 2	100 25			
	725.7 5	50 25			
4820.1	398.5 1	100			
	779.9 3	24 11			
4847.4	765.9 10	100 33			
	937.3 10	67 33			
4954.8	743.7 10	100			
5148.6	436.6 9	100 25			
	855.5 4	<50			
5170.8	714.6 3	100			
5191.8	411.4 2	100			
5199.6	394.7 2	100			
5225.4	772.1 10	100			
5235.8	415.6 2	100 25			
	814.8 4	75 25			
5338.6	767.7 10	100			
5428.6	737.7 2	100			
5618.6	426.7 2	100			
	838.4 5	50			
5666.9	431.2 10	100			
	846.7 10	100			

† The adopted values represent weighted averages from different studies. The intensities are known with high precision in ^{182}Ta β^- decay, thus values from this decay are preferred when available. In cases where large discrepancies are found, those values were not considered in deducing averages. In $(\alpha, 2n\gamma)$, many such cases are noted where the relative branching ratios are discrepant, generally being much higher than in other studies. For gammas from high-spin levels above 2500 keV, gamma-ray energies and intensities are almost entirely from $^{176}\text{Yb}(^{13}\text{C}, \alpha 3n\gamma)$ dataset since this dataset provides the most complete set of values.

‡ From ce and angular distribution/correlation studies in ^{182}Ta decay, ^{182}Re decay and in-beam γ -ray studies.

§ From evaluation by 2000He14.

$^\#$ Theoretical values from BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" approximation. If mixing ratio δ is not given, it was assumed as 1.0 for E2/M1 and E3/M2 and 0.10 for others.

$^\circ$ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)(A) $K\pi=0+$, g.s.
band.(B) $K\pi=0+$ band.(C) $K\pi=2+$, γ band. $^{182}_{74}\text{W}_{108}$

Adopted Levels, Gammas (continued)(D) $K\pi=2-,$ octupole band.(E) $K\pi=10+,$
 $\nu 9/2[624] \otimes \nu 11/2[615].$ (F) $K\pi=(16+), 4\text{-qp band.}$ (G) $K\pi=(17-), 4\text{-qp band.}$

Adopted Levels, Gammas (continued)(H) $K\pi=4-, \nu 9/2[624] \otimes \nu 1/2[510]$.(I) $K\pi=6+, \pi 5/2[402] \otimes \pi 7/2[404]$.(J) $K\pi=5-, \nu 9/2[624] \otimes \nu 1/2[510]$.

Adopted Levels, Gammas (continued)(K) $K\pi=6-, \nu 9/2[624] \otimes \nu 3/2[512]$.(L) $K\pi=7-,$
 $\pi 9/2[514] \otimes \pi 5/2[402]$.(M) $K\pi=8-,$
 $\nu 9/2[624] \otimes \nu 7/2[503]$.

Adopted Levels, Gammas (continued)

 (N) $K\pi=15+, 4\text{-qp}$ band.

 (O) $K\pi=18-, \nu^2_{(10+)} \otimes \pi^2_{(8-)}$

 (P) $K=(12)$ band.

Adopted Levels, Gammas

$Q(\beta^-) = -8.4 \times 10^2$ 10; $S(n) = 7000$ 100; $S(p) = 4480$ 100; $Q(\alpha) = 2730$ SY 2012Wa38.

Estimated uncertainty for $Q(\alpha) = 120$ (2012Wa38).

$S(2n) = 15750$ 100, $S(2p) = 11090$ 100 (2012Wa38).

First identification of ^{182}Re by 1950Wi14, 1950Dy61, 1950St89.

 ^{182}Re Levels**Cross Reference (XREF) Flags**

A ^{182}Os ϵ Decay (21.84 h)

B $^{176}\text{Yb}(^{11}\text{B}, 5n\gamma)$

C $^{181}\text{Ta}(\alpha, 3n\gamma)$, $^{182}\text{W}(p, n\gamma)\dots$

E(level) [†]	$J\pi^{\ddagger}$	XREF	$T_{1/2}^{\S}$	Comments
0.0@	7+	BC	64.2 h 5	$\%e + \% \beta^+ = 100$. $\mu = 2.83$ 6 (1983Sp05, 1980Sp01, 2014StZZ). $Q = 4.1$ 3 (1983Ha49, 2014StZZ, 2013StZZ). $J\pi$: spin from nuclear orientation measurement (1983Sp05). Parity from $\log f^{\text{lu}} t = 8.3$ to 5-. $T_{1/2}$: weighted average of 64.3 5 (2011Bo01, from 1427.4γ-decay curve, source produced in W(p,xn) reaction), 64.3 h 32 (2014Ma43, same group as 2011Bo11 but source produced in W(d,xn) reaction) and 64.0 h 5 (1950Wi14). Other: 60 h (1958Ga24). μ: from 1983Sp05, 1980Sp01 (NMR/rad. detection). Other: 2.84 6 from 1981Ha22 (NMR/rad. detection). Q: from 1983Ha49 (NMR-ON). $\%e + \% \beta^+ = 100$. $\mu = 3.26$ 10 (1987Oh10, 2014StZZ). $Q = +1.8$ 2 (1981Er01, 1985Ha41, 2014StZZ, 2013StZZ). E(level): 2012Au07 give x=60 100, 1984Sl01 estimate it as ≈ 50 keV based on singlet and triplet coupling of $\pi 5/2[402]$ and $\nu 9/2[624]$. $T_{1/2}$: from 470.3γ-decay curve, weighted average of 14.50 h 45 (2014Ma43, source produced in W(d,xn) reaction) and 13.74 h 48 (2011Bo01, source produced in W(p,xn) reaction). Others: 12.7 h 2 (1950Wi14), 14 h (1950Dy61), 13 h (1959Ga15), 12.5 h 5 (1963Ba37). Value of 12.7 h 2 from 1950Wi14 has been adopted for the last 75 years or so, but recent measurements (2014Ma43 and 2011Bo01 report a higher value near 14 h). The value measured by 1963Ba37 from positron spectra recorded with a magnetic spectrometer agreed with that from 1950Wi14. However, the evaluator prefers to adopt a weighted average of the recent values from 2014Ma43 and 2011Bo01, since in 1950Wi14 and also perhaps in 1963Ba37, the value was deduced from a composite exponential decay curve of both the activities of ^{182}Re, whereas in 2011Bo01 and 2014Ma43, $T_{1/2}$ is deduced from decay curve for a 470.3γ ray which is emitted by the decay of the isomeric activity only, thus providing a better selectivity. $J\pi$: spin from atomic-beam magnetic resonance (1975Ru06, 1978Ru04); parity from M1 γ from 1+. μ: from 1987Oh10 (nuclear orientation). Other: 3.15 33 (1980Sp01). Q: from 1981Er01 (nuclear orientation), also 1985Ha41. $T_{1/2}$: from 1970Ak02. $J\pi$: E2 γ from 1+; M1+E2 γ to 2+; band assignment. $J\pi$: γ to (3)+; band assignment. $J\pi$: $\Delta J = 1$, (M1+E2) γ to 7+. $J\pi$: $\Delta J = 1$, (M1) γ to (4+). $\mu = +2.15$ 8 (1978Be67, 2014StZZ). $J\pi$: E1 γ to (3)+; E1 γ from 1+; (E1+M2) γ to 2+. $T_{1/2}$: average of 570 ns 30 (1973Bu08) and 600 ns 30 (1969An13). μ: from 1978Be67 (TDPAC). $J\pi$: E1+M2 γ from 1+; E1 γ to 2+; $\log ft = 6.2$ from 0+. $T_{1/2}$: from 1969An13. $J\pi$: M1(+E2) γ from (1,2)-; (M1) γ to 1-. $J\pi$: $\Delta J = 1$, (M1+E2) γ to (8+); $\Delta J = (2)$ γ to 7+. L: $\Delta J = 1$, (M1) γ to (5+). $J\pi$: E1 γ from 1+; E1(+M2) γ to 2+. $T_{1/2}$: from 1970Ak02. $J\pi$: $\log ft = 7.6$ from 0+; M1+E2 γ to 1-; M1(+E2) γ to (2)-.
0.0+x&	2+	A C	14.14 h 45	
55.502+x& 10	(3)+	A C	<0.22 ns	
131.81+x& 10	(4)+	C		
154.15# 8	(8+)	BC		
227.51+x& 14	(5+)	C		
235.732+x 22	(2)-	A C	585 ns 30	
263.278+x 24	1-	A C	5.1 ns 2	
268.750+x 25	(0, 1, 2)-	A		
339.45@ 8	(9+)	BC		
347.01+x& 17	(6+)	C		
379.22+x 3	(1, 2)-	A	<0.5 ns	
438.28+x 5	1-	A		

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Adopted Levels, Gammas (continued) ^{182}Re Levels (continued)

E(level) [†]	$J\pi^{\ddagger}$	XREF	$T_{1/2}^{\S}$	Comments
443.15 ^d 13	(9-)	BC	6 ns 2	$J\pi$: $\Delta J=1$, (E1) γ to (8+). $T_{1/2}$: from $\gamma\gamma(t)$ in $^{181}\text{Ta}(\alpha,3n\gamma)$, $^{182}\text{W}(p,n\gamma)$ (1984SI01).
461.3+x ^e 1	(4-)	C	0.78 μ s 9	$J\pi$: γ to 2+; long level half-life suggests mult(461 γ) is M2 or higher. $T_{1/2}$: from $\gamma\gamma(t)$ in $^{181}\text{Ta}(\alpha,3n\gamma)$, $^{182}\text{W}(p,n\gamma)$ 1984SI01.
483.41+x ^{&} 20	(7+)	C		
510.05+x 3	1+	A	<0.5 ns	$J\pi$: $\log ft=5.3$ from 0+. $T_{1/2}$: from 1970Ak02.
541.10+x ^e 14	(5-)	C		
549.67+x 5	(1-)	A		$J\pi$: M1 γ to 1-; $\log ft=7.1$ from 0+. $J\pi=0-$ is considered as less likely for possible E2 admixture in 111.39 γ to 1-.
552.01 [#] 9	(10+)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (9+); $\Delta J=2$ γ to (10-).
554.57+x 6	(2+)	A		$J\pi$: M1+E2 γ from 1+; M1+E2 γ to (3+).
624.99 ^c 15	(10-)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (9-).
644.7+x ^{&} 3	(8+)	C		$J\pi$: $\Delta J=1$, (M1) γ to (7+).
648.20+x ^e 17	(6-)	C		$J\pi$: $\Delta J=1$, (M1) γ to (5-).
726.97+x 5	1+	A		$J\pi$: M1+E2 γ to 2+; M1 γ to 1+; $\log ft<6.3$ from 0+.
779.6+x ^e 2	(7-)	C		$J\pi$: $\Delta J=1$, (M1) γ to (6-).
789.53 [@] 10	(11+)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (10+); $\Delta J=2$ γ to (9+).
819.8+x ^{&} 3	(9+)	C		
834.31 ^d 15	(11-)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (10-); $\Delta J=2$ γ to (9-).
940.0+x ^e 3	(8-)	C		$J\pi$: $\Delta J=1$, (M1+E2) γ to (7-).
1017.0+x ^{&} 3	(10+)	C		
1050.41 [#] 11	(12+)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (11+); $\Delta J=2$ γ to (10+).
1069.21 ^c 16	(12-)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (11-); γ to (10-).
1119.3+x ^e 3	(9-)	C		
1227.6+x ^{&} 3	(11+)	C		
1328.11 ^d 16	(13-)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (12-); γ to (11-).
1332.76 [@] 13	(13+)	BC		$J\pi$: $\Delta J=1$, (M1+E2) γ to (12+); $\Delta J=2$ γ to (11+).
1336.3+x ^e 3	(10-)	C		$J\pi$: $\Delta J=1$, (M1+E2) γ to (9-).
1457.7+x ^{&} 5	(12+)	C		
1557.1+x ^e 3	(11-)	C		
1609.12 ^c 17	(14-)	BC		$J\pi$: $\Delta J=1$ γ to (13-); γ to (12-).
1636.17 [#] 13	(14+)	BC		$J\pi$: $\Delta J=1$ γ to (13+); γ to (12+).
1833.1+x ^e 4	(12-)	C		
1911.94 ^d 18	(15-)	BC		$J\pi$: $\Delta J=1$ γ to (14-); γ to (13-).
1957.28 [@] 14	(15+)	BC		
2233 ^c	(16-)	B		
2256.48 ^f 19	(16-)	BC	82 ns 1	$\mu=+3.82$ 13 (1988Ja02,2014StZZ). $g=+0.239$ 8 (1988Ja02). g factor measured by in-beam $\gamma(\theta,H,t)$ (TDPAD) technique. $J\pi$: (E2) γ to (14-); (M1) γ to (15-). Proposed (1988Ja02) as $K\pi=(16-)$ 4-quasiparticle state with configuration= $\pi 9/2[514] \otimes \nu[(9/2[624])(7/2[514])(7/2[503])]$. $T_{1/2}$: from $\gamma\gamma(t)$ in $(\alpha,3n\gamma)$ (1988Ja02). Other: 88 ns 8 (1984SI01).
2298.92 [#] 15	(16+)	BC		
2524.48 ^a 21	(16+)	BC		L: $\Delta J=0$ γ to (16-).
2576 ^d	(17-)	B		
2614.7 ^g 3	(17-)	BC		$J\pi$: $\Delta J=1$ γ to (16-).
2650 [@]	(17+)	B		
2804 ^b	(17+)	B		
2931 ^c	(18-)	B		
2990 ^f	(18-)	B		
3025 [#]	(18+)	B		
3098 ^a	(18+)	B		
3312 ^d	(19-)	B		
3382 ^g	(19-)	B		
3400 [@]	(19+)	B		
3419 ^b	(19+)	B		
3694 ^c	(20-)	B		
3759 ^{?a}	(20+)	B		
3789 ^f	(20-)	B		
3822 [#]	(20+)	B		
4112 ^d	(21-)	B		

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Adopted Levels, Gammas (continued)
¹⁸²Re Levels (continued)

E(level) [†]	Jπ [‡]	XREF	E(level) [†]	Jπ [‡]	XREF	E(level) [†]	Jπ [‡]	XREF
4116? b	(21+)	B	4649#	(22+)	B	5488#	(24+)	B
4190@	(21+)	B	4942d	(23-)	B	5530? f	(24-)	B
4206g	(21-)	B	5013@	(23+)	B	5858@	(25+)	B
4507c	(22-)	B	5076? g	(23-)	B			
4633? f	(22-)	B	5352c	(24-)	B			

[†] From least-squares fit to E_γ data.

[‡] For high-spin (J>3) states, ascending spins are assumed with the rise in excitation energy, as expected from yrast type of population of levels in in-beam, heavy-ion γ-ray studies. The transitions involving ΔJ=2 from angular distributions are generally treated as E2 from RUL and those with ΔJ=1 and significant D+Q admixtures as M1+E2. In addition to arguments listed under comments, band assignment is implicitly used in cases of long cascades of transitions.

§ From γγ(t) in ¹⁸²Os ε decay, unless otherwise stated.

(A): Kπ=7+, 2-qp band, α=0. Configuration=π5/2[402]⊗v9/2[624]. E₀=-535.6, A=9.15, B=0.0066.

@ (B): Kπ=7+, 2-qp band, α=1. Configuration=π5/2[402]⊗v9/2[624]. E₀=-535.6, A=9.15, B=0.0066.

& (C): Kπ=2+ band. E₀=-55.7, A=9.21, B=0.0079.

a (D): Kπ=(16+), 4-qp band, α=0. Configuration=π9/2[514]⊗v³(7/2[503], 7/2[633], 9/2[624]).

b (E): Kπ=(16+), 4-qp band, α=1. Configuration=π9/2[514]⊗v³(7/2[503], 7/2[633], 9/2[624]).

c (F): Kπ=(9-), 2-qp band, α=0. Configuration=π9/2[514]⊗v9/2[624]. E₀=-301.9, A=7.57, B=0.0078.

d (G): Kπ=(9-), 2-qp band, α=1. Configuration=π9/2[514]⊗v9/2[624]. E₀=-301.9, A=7.57, B=0.0078.

e (H): Kπ=(4-). E₀=314.8, A=6.75, B=0.028.

f (I): Kπ=(16-), 4-qp band, α=0. Configuration=π9/2[514]⊗v³(7/2[514], 7/2[503], 9/2[624]).

g (J): Kπ=(16-), 4-qp band, α=1. Configuration=π9/2[514]⊗v³(7/2[514], 7/2[503], 9/2[624]).

γ(¹⁸²Re)

E(level)	E _γ [†]	I _γ [†]	Mult. [‡]	δ [‡]	α [#]	I(γ+ce)	Comments
55.502+x	55.50 1	100	M1+E2	0.047 8	5.07 9		B(M1)(W.u.)>0.91; B(E2)(W.u.)>22.
131.81+x	76.3 1	100	[M1]		11.21		
154.15	154.15 8	100	(M1+E2)	+0.32 3	1.439 24		
227.51+x	95.7 1	100	(M1)		5.86		
235.732+x	180.20 3	100 6	E1		0.0840		B(E1)(W.u.)=5.6×10 ⁻⁸ 5.
	235.75 6	1.0 3	(E1+M2)	0.2 1	0.122 92		B(E1)(W.u.)=2.4×10 ⁻¹⁰ ; B(M2)(W.u.)=0.0008.
263.278+x	27.53 2	9.3 19	M1		39.2		B(M1)(W.u.)=0.039 11.
	207.80@ 6	<0.4					
	263.29 5	100 3	E1		0.0325		B(E1)(W.u.)=4.5×10 ⁻⁷ 8; B(M2)(W.u.)=0.07.
268.750+x	5.47 1		(M1)		1096	=100	
	268.8@ 5	<1					
339.45	185.30 7	100 6	(M1+E2)	+0.39 5	0.834 19		
	339.45 8	39 3	(Q)				
347.01+x	119.5 1	100	(M1)		3.10		
379.22+x	110.46 2	31 5	M1(+E2)	<0.65	3.72 18		B(M1)(W.u.)>0.0014.
	115.92 5	89 9	M1(+E2)	<1.4	3.0 4		B(M1)(W.u.)>0.0036.
	143.50 4	11.3 21	M1+E2	=1	=1.436		B(M1)(W.u.)>0.00024.
	379.22 7	100 9	E1(+M2)	<0.12	0.017 3		B(E1)(W.u.)>1.1×10 ⁻⁶ ; B(M2)(W.u.)>1.4.
438.28+x	174.98 7	100 19	M1+E2	0.9 4	0.81 14		
	202.51 10	21 4	M1(+E2)	<1	0.60 10		
	438.46 15	29 13					
443.15	289.0 1	100	(E1)		0.0259		B(E1)(W.u.)=1.4×10 ⁻⁶ 5.
461.3+x	461.3 1	100	[M2]		0.239		B(M2)(W.u.)=0.048 6.
483.41+x	136.4 1	100					
510.05+x	130.80 3	6.3 3	E1		0.192		B(E1)(W.u.)>9.8×10 ⁻⁶ .
	241.31 6	1.75 10	(E1)		0.0402		B(E1)(W.u.)>4.2×10 ⁻⁷ ; B(M2)(W.u.)>1.3.
	246.77 6	1.15 9	E1+M2	0.14 3	0.072 16		B(E1)(W.u.)>1.8×10 ⁻⁷ ; B(M2)(W.u.)>6.6.
	274.33 5	3.48 14	E1		0.0294		B(E1)(W.u.)>5.9×10 ⁻⁷ .
	454.60 7	0.56 4	E2		0.0278		B(E2)(W.u.)>0.0043.
	510.04 7	100	M1		0.0581		B(M1)(W.u.)>0.00027.

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Re})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	Mult. [‡]	$\delta^{\ddagger}$	$\alpha^{\#}$	Comments
541.10+x	79.8 1	100	[M1]		9.87	
549.67+x	111.39 3	18 5	M1 (+E2)	<0.7	3.61 19	
	170.44 7	100 15	[M1+E2]		0.84 29	
	286.39 10	30 10	M1		0.270	
552.01	212.56 7	100 9	(M1+E2)	+0.40 6	0.564 16	
	397.86 8	74 4	(Q)			
554.57+x	499.08 8	100 26	M1+E2	0.7 5	0.048 12	
	554.68 20	98 11	M1		0.0467	
624.99	181.84 8	100	(M1+E2)	+0.23 2	0.921 14	
644.7+x	161.3 2	100	(M1)		1.325	
648.20+x	107.1 1	100	(M1)		4.25	
726.97+x	172.41 7	46 7	M1+E2	0.9 3	0.85 11	
	216.91 5	100 7	M1		0.579	
	458.28 [@] 10	<3.5				
	726.98 20	17.7 21	M1 (+E2)	<0.8	0.021 3	
779.6+x	131.4 1	100	(M1)		2.37	
789.53	237.52 7	89 6	(M1+E2)	+0.49 7	0.399 14	
	450.08 8	100 6	Q			
819.8+x	175.1 1	100	[M1]		1.052	
834.31	209.32 7	100 5	(M1+E2)	+0.32 3	0.605 11	
	391.16 8	13.8 8	(Q)			
940.0+x	160.4 2	100	(M1+E2)		1.02 33	
1017.0+x	197.2 1	100				
1050.41	260.88 7	42.4 24	(M1+E2)	+0.53 11	0.302 16	
	498.40 8	100 5	Q			
1069.21	234.89 7	100 4	(M1+E2)	+0.35 5	0.435 10	
	444.22 8	40 3				
1119.3+x	179.3 1	100				
1227.6+x	210.6 1	100				
1328.11	258.90 7	100 7	(M1+E2)	+0.30 7	0.338 10	
	493.79 8	73 7				
1332.76	282.35 9	46 8	(M1+E2)	+0.50 11	0.246 13	
	543.23 8	100 8	(Q)			
1336.3+x	217.0 1	100	(M1+E2)		0.41 17	
1457.7+x	230.1 3	100				
1557.1+x	220.8 1	100				
1609.12	281.01 9	100	(M1+E2)	+0.42 11	0.258 13	
	539.91 8	76 5				
1636.17	303.40 9	31 8	[M1+E2]	0.47 [§] 6	0.205 7	
	585.76 8	100 6				
1833.1+x	276.0 1	100				
1911.94	302.82 8	87 14	[M1+E2]	0.36 [§] 4	0.215 5	
	583.84 8	100 7				
1957.28	321.11 9	47 3				
	624.52 8	100 11				
2233	321					
	624					
2256.48	344.54 8	69 6	(M1)		0.1640	B(M1)(W.u.)=2.5×10 ⁻⁶ 3.
	647.36 8	100 8	(E2)		0.01188	B(E2)(W.u.)=0.00054 6.
2298.92	341.64 8	50 6				
	662.76 8	100 8				
2524.48	268.0 1	100	D			Mult.: ΔJ=0 γ.
2576	343					
	664					
2614.7	358.2 2	100	D+Q			
2650	354					
	695					
2804	280					
2931	355					
	698					
2990	376					
	734					
3025	375					

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Re})$ (continued)

E(level)	$E\gamma^\dagger$	E(level)	$E\gamma^\dagger$	E(level)	$E\gamma^\dagger$
3025	730	3694	763	4507	813
3098	294	3759?	661@	4633?	844@
	574	3789	407	4649	827
3312	382		798	4942	830
	737	3822	797	5013	823
3382	392	4112	418	5076?	870@
	768		800	5352	845
3400	375	4116?	697@	5488	839
	750	4190	790	5530?	898@
3419	321	4206	418	5858	845
	615		824		
3694	382	4507	395		

[†] Values are from ^{182}Os ϵ decay for transitions from low-spin ($J < 4$) states and from $^{181}\text{Ta}(\alpha, 3n\gamma)$ for high-spin ($J > 3$) states.

Above 2614 level, values are available only from $^{176}\text{Yb}(^{11}\text{B}, 5n\gamma)$.

[‡] From ce data in ^{182}Os ϵ decay for low-spin ($J < 4$) states, from $\gamma(\theta)$ in $^{181}\text{Ta}(\alpha, 3n\gamma)$ for transitions from high-spin ($J > 3$) states.

All $\Delta J=2$, quadrupole transitions are treated as E2 and most $\Delta J=1$, dipole or dipole+quadrupole transitions as M1 or M1+E2, respectively from band structure arguments. Intensity-balance arguments are also used in some cases for tentative assignment of multipolarities.

[§] Deduced by 1984Sl01 from cascade/crossover γ -ray intensity ratio in the band and rotational model, assuming M1+E2 for cascading transition and E2 for crossover transition.

[#] From BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" appr. $\delta(\text{E2/M1})=1$ assumed when not given.

@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)(E) $K\pi=(16+), 4\text{-qp band}, \alpha=1.$ (F) $K\pi=(9-), 2\text{-qp band}, \alpha=0.$ (G) $K\pi=(9-), 2\text{-qp band}, \alpha=1.$ (H) $K\pi=(4-).$

Adopted Levels, Gammas (continued)

 (I) $K\pi=(16-), 4\text{-qp}$ band,
 $\alpha=0$.

 (J) $K\pi=(16-), 4\text{-qp}$ band,
 $\alpha=1$.

Adopted Levels, Gammas

$Q(\beta^-) = -5560$ 30; $S(n) = 9130$ 30; $S(p) = 5377$ 25; $Q(\alpha) = 3375$ 27 2012Wa38.

$S(2n) = 16390$ 27, $S(2p) = 9548$ 22 (2012Wa38).

Nuclear structure calculations (levels, band structures, deformations, configurations, B(E2), etc.): 2011Ga35, 2010Bu02, 2010Ad04 (2-qp 8- states), 2009Ha45 (tilted axis rotational states), 2008Sa21, 2006Ha27, 2004Ra15, 2003Bo13, 2000Oi03, 1999An17, 1999An38, 1999Ho03, 1998Xu01, 1996Ho01, 1994Eg02, 1990Ma13, 1989Be13, 1988Ch40, 1987Wa35, 1986Ta15, 1982Ga04, 1980Gu14, 1980Zh07, 1978Fa05.

First identification of ^{182}Os by 1950St89.

 ^{182}Os Levels

Labels for quasineutron orbitals:

A: 9/2[624], $\alpha = +1/2$.

B: 9/2[624], $\alpha = -1/2$.

C: 7/2[633], $\alpha = +1/2$.

D: 7/2[633], $\alpha = -1/2$.

E: 7/2[514], $\alpha = +1/2$.

F: 7/2[514], $\alpha = -1/2$.

G: 1/2[521], $\alpha = +1/2$.

H: 1/2[521], $\alpha = -1/2$.

Cross Reference (XREF) Flags

A ^{182}Ir ϵ Decay (15.0 min)

B ^{186}Pt α Decay (2.08 h)

C $^{136}\text{Xe}(^{50}\text{Ti}, 4n\gamma)$

D $^{150}\text{Nd}(^{36}\text{S}, 4n\gamma)$: Prompt γ

E $^{150}\text{Nd}(^{36}\text{S}, 4n\gamma)$: Delayed γ

F $^{168}\text{Er}(^{18}\text{O}, 4n\gamma)$

G $^{170}\text{Er}(^{16}\text{O}, 4n\gamma)$

H $^{182}\text{W}(\alpha, 4n\gamma), ^{186}\text{W}(\alpha, 8n\gamma) \dots$

E(level) [†]	$J\pi^{\ddagger}$	XREF	$T_{1/2}$	Comments
0.0 ^{\$}	0+	ABCDEFGH	21.84 h 20	% $\epsilon = 100$. J π : ABMR measurement of spin (1978Ru04, 1975Ru06). $T_{1/2}$: weighted average of 22.0 h 2 (1976Ka22), 22.10 h 25 (1973Sv01), 22.6 h 24 (1969Hu03), 21.1 h 3 (1960Ne03) and 21.9 h 1 (1958Fo47); reduced $\chi^2 = 2$. Values of 20.0 h 2 (1963Gr22) and 24 h 1 (1950St89) seem discrepant, thus not included in the averaging procedure. Weighted average of all the measurements is: 21.6 h 3, but with reduced $\chi^2 = 17$. Other: 1966Be47.
126.89 ^{\$} 8	2+	A CDEFGH	813 ps 11	J π : E2 γ to 0+. $T_{1/2}$: from $\gamma\gamma(t)$ in ^{182}Ir ϵ decay (1970BrZP). Other: 0.95 ns 10 (1972HuZL, 1970ErZY). 2001Ra27 evaluation of these two measurements lists 832 ps 69.
400.29 ^{\$} 9	4+	A CDEFGH		J π : $\Delta J = 2$, E2 γ to 2+.
794.00 ^{\$} 12	6+	A CDEFGH		J π : $\Delta J = 2$, E2 γ to 4+.
890.61 [#] 8	2+	A D FGH		J π : E2 γ to 0+.
1039.04 [#] 9	3+	A D FGH		J π : E2+M1 γ to 2+; $\gamma\gamma(0)$ in ^{182}Ir ϵ .
1159.88 12	2+	A		J π : E0+M1+E2 γ to 2+; γ s to 0+ and 4+.
1190.30 [#] 10	4+	A D F H		J π : E2+M1 γ to 4+; $\gamma\gamma(0)$ in ^{182}Ir ϵ .
1277.90 ^{\$} 19	8+	CDEFGH		J π : $\Delta J = 2$, E2 γ to 6+.
1378.25 11	4+	A		J π : E0+M1+E2 γ to 4+; γ s to 2+ and 6+.
1393.18 12	(2+)	A		J π : (E0+E2+(M1)) or abnormal M1+E2 γ to 2+.
1399.47 [#] 13	5+	A D FGH		J π : E2+M1 γ to 4+; γ to 6+.
1471.76 ⁱ 13	3-	A D FG		J π : $\Delta J = (0)$ γ to 3+; probable bandhead, higher spins of this band are better established.
1522.73 13	(2+, 3, 4+)	A		J π : γ s to 2+ and 4+.
1537.39 19	(1+ to 4+)	A		J π : γ s to 2+ and 3+.
1588.54 [#] 19	6+	A D G		J π : γ s to 4+ and 6+; band assignment.
1617.42 12	(3, 4)+	A		J π : M1 or E0+(M1)+E2 γ to 4+; γ to 2+.
1627.41 14	(3+, 4, 5+)	A		J π : γ s to 3+ and (5)+.
1640.89 12	(2+, 3, 4+)	A		J π : γ s to 2+ and 4+.
1654.15 ⁱ 14	5-	A D FG		J π : E1 γ to 4+; (E1) γ to 6+.
1669.42 16	(4+)	A		J π : γ s to 3+, (3-) and 6+.
1676.59 22	(1, 2)	A		J π : γ to 2+, possible γ to 0+.
1734.85 ^l 17	5-	A D FG		J π : $\Delta J = 1$, (E1) γ to 4+, E2 γ from 7-.
1756.41 ^j 21	6-	A D FG		J π : $\Delta J = 1$, (M1+E2) γ to 5-; M1 γ from 7-.
1768.89 22	(1, 2)	A		J π : γ to 2+, possible γ to 0+.
1785.48 18	(3+, 4, 5+)	A		J π : γ s to 3+ and (5)+.
1801.30 ^g 18	4-	D F		J π : $\Delta J = 1$, (E1) γ to 3+; M1 γ from 5-.
1812.00 ^{\$} 25	10+	CDEFGH		J π : $\Delta J = 2$ γ to 8+.

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Adopted Levels, Gammas (continued)

 ^{182}Os Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF	T _{1/2}	Comments
1813.3? 4		A		
1831.4d 3	(8)-	D FGH	0.78 ms 7	%IT=100. T _{1/2} : from $\gamma(t)$ in $^{168}\text{Er}(^{18}\text{O},4n\gamma)$ (1966Bu08). J π : E1 γ to 8+.
1844.40? 22		A		
1853.1# 3	7+	D G		J π : $\Delta J=1$ γ to 6+; γ to 5+.
1876.43 24	(3,4,5+)	A		J π : γ to 3+; population in heavy-ion reactions disfavors 1+,2.
1878.63i 22	7-	D FG		J π : $\Delta J=1$ γ s to 6+ and 6-; $\Delta J=2$ γ to 5-.
1891.4m 4	(6-)	D G		J π : γ to 5+.
1895.48h 18	5-	A D FG		J π : $\Delta J=1$, E1 γ to 4+; $\Delta J=1$, (E1) γ to 6+.
1899.21 23	(2+,3,4+)	A		J π : γ s to 2+ and 4+.
2013.9e 4	(9)-	DEFG		J π : $\Delta J=1$ γ to (8)-.
2016.67l 24	7-	D FG		J π : E1 γ s to 6+ and 8+.
2025.08g 25	6-	D FG		J π : $\Delta J=1$ γ to 5-; γ to 4-; band assignment.
2025.09 23	(1+ to 4+)	A		J π : γ s to 2+ and 3+.
2035.37j 25	8-	D FG		J π : $\Delta J=1$ γ to 7-; $\Delta J=2$ γ to 6-.
2059.5? 4		A		
2112.61@ 24	(8)+	DEFG		J π : $\Delta J=(0)$, M1 γ to 8+; $\Delta J=(2)$ γ to 6+; probable bandhead.
2147.45 24	(4+,5,6+)	A		J π : γ s to 4+ and 6+.
2181.8h 3	7-	D FG		
2193.4i 3	9-	D FG		J π : $\Delta J=1$ γ to 8-; $\Delta J=2$ γ to 7-.
2220.0d 4	(10)-	DEFG		J π : $\Delta J=1$ γ to (9)-; $\Delta J=2$ γ to (8)-.
2235.0m 4	(8-)	G		J π : $\Delta J=1$ γ to 7+; $\Delta J=2$ γ to (6-).
2245.7& 3	(9)+	DEFG		J π : M1(+E2) γ to 8+; band assignment.
2346.1s 3	12+	CDEFGH		J π : $\Delta J=2$ γ to 10+.
2371.5g 3	8-	D FG		J π : $\Delta J=1$ γ to 7-; $\Delta J=2$ γ to 6-.
2374.86@ 25	(10)+	DEFG		J π : $\Delta J=(0)$ γ to 10+; $\Delta J=2$, E2 γ to 8+.
2380.8l 3	9-	D FG		J π : $\Delta J=2$ γ to 7-; γ to 8+.
2419.6j 3	10-	D FG		J π : $\Delta J=1$ γ to 9-; $\Delta J=2$ γ to 8-.
2449.2e 4	(11)-	DEFG		J π : $\Delta J=1$ γ to (10)-; $\Delta J=2$ γ to (9)-.
2526.5& 3	(11)+	DEFG		J π : $\Delta J=(1)$ γ to (10)+; $\Delta J=(2)$ γ to (9)+.
2583.2h 4	9-	D FG		J π : $\Delta J=1$ γ to 8-; $\Delta J=2$ γ to 7-.
2591.4i 3	11-	D FG		J π : $\Delta J=(1)$ γ to 10-; $\Delta J=2$ γ to 9-.
2651.9m 4	(10-)	D G		J π : $\Delta J=(2)$ γ to (8-).
2671.9@ 3	(12)+	DEFG		J π : $\Delta J=(0)$ γ to 12+; $\Delta J=(2)$, (E2) γ to 10+.
2700.3d 4	(12)-	DEFG		J π : $\Delta J=1$ γ to (11)-; $\Delta J=(2)$ γ to (10)-.
2803.5n 4	(12+)	D FG		J π : $\Delta J=(0)$ γ to 12+; $\Delta J=(2)$ γ to 10+.
2818.8g 4	10-	D FG		J π : $\Delta J=1$ γ to 9-; $\Delta J=2$ γ to 8-.
2824.1l 4	11-	D FG		J π : $\Delta J=2$ γ to 9-.
2840.7s 3	14+	CDEFGH		J π : $\Delta J=2$ γ to 12+.
2869.9& 3	(13)+	DEFG		J π : $\Delta J=(1)$ γ to (12)+; $\Delta J=2$ γ to (11)+.
2908.5j 4	12-	D FG		J π : $\Delta J=2$ γ to 10-; γ to 11-.
2972.5e 4	(13)-	DEFG		J π : $\Delta J=1$ γ to (12)-; $\Delta J=2$ γ to (11)-.
3071.9h 4	11-	D FG		J π : $\Delta J=1$ γ to 10-; $\Delta J=2$ γ to 9-.
3072.1i 4	13-	D FG		J π : $\Delta J=2$ γ to 11-.
3073.1@ 3	(14)+	DEFG		J π : $\Delta J=(0)$ γ to 14+; $\Delta J=2$, E2 γ to 12+.
3133.0m 11	(12-)	D		J π : $\Delta J=2$ γ to (10-).
3189.2 6		G		J π : $\Delta J=(2)$ γ to (10-).
3264.9d 4	(14)-	D FG		J π : $\Delta J=1$ γ to (13)-; $\Delta J=2$ γ to (12)-.
3291.2n 4	(14)+	DEFG		J π : $\Delta J=2$, E2 γ to 12+; $\Delta J=(0)$ γ to 14+.
3304.1& 4	(15)+	DEFG		J π : $\Delta J=2$ γ to (13)+; γ to (14)+.
3320.1s 4	16+	CDEFGH		J π : $\Delta J=2$ γ to 14+.
3330.5g 4	12-	D F		J π : $\Delta J=(1)$ γ to 11-; γ to 10-.
3338.0l 4	13-	D FG		J π : $\Delta J=2$ γ to 11-.
3489.4j 4	14-	D FG		J π : $\Delta J=2$ γ to 12-; γ to 13-.
3573.4e 5	(15)-	D FG		J π : $\Delta J=1$ γ to (14)-; $\Delta J=2$ γ to (13)-.
3615.8h 5	13-	D FG		J π : $\Delta J=2$ γ to 11-; γ to 12-.
3617.6@ 4	(16)+	DEFG		J π : $\Delta J=2$ γ to 14+.
3639.7i 5	15-	D FG		J π : $\Delta J=(2)$ γ to 13-.
3644.4 5	(13-)	E		J π : γ to 11(-); possible K π =13- with a 4-quasiparticle configuration= $v[(7/2[514])(9/2[624])] \otimes \pi[(9/2[514])(1/2[541])]$ (1988Ch27).
3669.6m 15	(14-)	D		

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Adopted Levels, Gammas (continued) ^{182}Os Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF	T _{1/2}	Comments
3840.8& 4	(17)+	DEFG		J π : $\Delta J=2$ γ to (15)+; γ to (16)+.
3850.2n 4	(16+)	DEFG		J π : $\Delta J=(0)$ γ to 16+; $\Delta J=2$ γ to (14)+.
3857.2& 4	18+	CDEFGH		J π : $\Delta J=2$ γ to 16+.
3899.6g 7	14-	D		J π : $\Delta J=2$ γ to 12-; γ to 13-.
3903.7d 5	(16)-	D FG		J π : $\Delta J=2$ γ to (14)-; $\Delta J=(1)$ γ to (15)-.
3905.5l 6	15-	D FG		
3915.7 5	(15+)	E		
3929.9q 4	(15+)	E		J π : $\Delta J=(1)$, (M1+E2) γ to 14+.
3969.4f 5	(14-)	E		
4058.1 6	(16-)	G		
4070.9j 6	16-	D F		J π : $\Delta J=2$ γ to 14-.
4157.6 4	(16+)	E		J π : $\Delta J=2$ γ to 14+.
4166.4p 4	(16+)	E		J π : $\Delta J=2$ γ to (14+).
4185.3h 7	15-	D FG		J π : $\Delta J=2$ γ to 13-; γ to 14-.
4211.0f 5	(15-)	E		
4237.3e 6	(17)-	D FG		J π : $\Delta J=2$ γ to (15)-.
4255.5m 18	(16-)	D		
4275.3@ 4	(18)+	DEFG		J π : $\Delta J=2$ γ to (16)+.
4293.6i 6	17-	D FG		J π : $\Delta J=(2)$ γ to 15-.
4356.3k 9	(17-)	D		J π : $\Delta J=1$ γ to 16-.
4370.3a 5	(16+)	E	6 ns 2	T _{1/2} : from $\gamma\gamma(t)$ in ($^{36}\text{S}, 4n\gamma$) (1988Ch27). J π : (E1) γ to (15-); γ to 14+.
4425.7q 4	(17+)	E		J π : $\Delta J=2$ γ to (15+).
4437.3o 5	(17)	E		
4466.9l 6	17-	D FG		J π : $\Delta J=2$ γ to 15-.
4467.9n 4	(18+)	DE G		J π : $\Delta J=2$ γ to (16+); γ to 18+.
4476.4& 5	(19)+	DEF		J π : $\Delta J=2$ γ to (17)+.
4480.3& 4	20+	DEFGH		J π : $\Delta J=2$ γ to 18+.
4480.9g 10	16-	D		J π : $\Delta J=2$ γ to 14-; γ to 15-.
4516.3f 6	(16-)	E		
4598.3d 5	(18)-	D FG		J π : $\Delta J=2$ γ to (16)-.
4639.2j 7	18-	D F		J π : $\Delta J=1$ γ to (17-); γ to 16-.
4682.5a 5	(17+)	E		
4713.3p 4	(18+)	E		
4761.2 5	(18)	E		
4766.6h 7	17-	D F		J π : $\Delta J=2$ γ to 15-.
4879.5f 6	(17-)	E		
4907.6k 10	(19-)	D		J π : $\Delta J=2$ γ to (17-); $\Delta J=1$ γ to 18-.
4940.8e 8	(19-)	D FG		J π : $\Delta J=2$ γ to (17)-.
5005.2a 5	(18+)	E		
5008.0l 10	19-	D		
5012.0i 10	19-	D		
5024.4@ 4	(20)+	DEFG		J π : $\Delta J=2$ γ to (18)+.
5024.5q 4	(19+)	E		J π : $\Delta J=2$ γ to (17+).
5063.3o 5	(19)	E		
5127.7g 14	18-	D		
5142.0n 5	(20+)	DEF		J π : $\Delta J=2$ γ to (18+).
5180.7 6	(18)	E		
5192.3& 5	22+	DEFG		J π : $\Delta J=2$, E2 γ to 20+.
5205.4& 7	(21)+	DE		J π : $\Delta J=2$ γ to (19)+.
5246.1d 12	(20)-	D		
5257.3j 12	20-	D		
5332.8a 5	(19+)	E		
5358.1p 4	(20+)	E		
5383.7h 13	19-	D		
5485.8 5	(19)	E		
5505.4k 15	(21-)	D		J π : $\Delta J=2$ γ to (19-).
5587.4e 13	(21)-	D		
5607.0l 11	21-	D		J π : $\Delta J=2$ γ to 19-.
5674.6o 5	(21)	E		
5713.5q 4	(21+)	E		J π : $\Delta J=2$ γ to (19+); γ to (20+).
5726.1i 14	21-	D		

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Adopted Levels, Gammas (continued) ^{182}Os Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF	T _{1/2}	Comments
5777.8 5	(20+)	E		J π : γ s to (20+) and (19); possible K π =20+, 6-quasiparticle state with, configuration= $\nu[(7/2[503])(9/2[624])(7/2[514])(7/2[633])]\otimes\pi[(9/2[514])(1/2[541])]$ (1988Ch27).
5810.4@ 7	(22)+	DE		
5858.7 ^d 15	(22)-	D		
5983.2 4	(21+)	E		J π : $\Delta J=1$, (M1+E2) γ to (20+); $\Delta J=2$ γ to (19+); possible K π =21+, 6-quasiparticle state with configuration= $\nu[(9/2[505])(9/2[624])(7/2[514])(7/2[633])]\otimes\pi[(9/2[514])(1/2[541])]$ (1988Ch27).
5987.6 ^s 5	24+	DEFG		J π : $\Delta J=2$ γ to 22+.
6017.4 ^{&} 9	(23)+	DE		J π : $\Delta J=2$ γ to (21)+.
6047.8 ^h 16	21-	D		
6088.6 ^p 4	(22+)	E		
6219.4 ^e 16	(23)-	D		
6258.4 ^l 15	23-	D		J π : $\Delta J=2$ γ to 21-.
6281.7 4	(22+)	E		J π : $\Delta J=1$, (M1+E2) γ to (21+); possible K π =21+, 6-quasiparticle state with configuration= $\nu[(9/2[505])(11/2[615])(7/2[514])(7/2[633])]\otimes\pi[(9/2[514])(1/2[541])]$ (1988Ch27).
6322.6 ^o 4	(23)	E		
6483.6 ^q 4	(23+)	E		
6543.7 4	(23+)	E		J π : $\Delta J=1$, (M1+E2) γ to (22+); $\Delta J=2$ γ to (21+); possible K π =23+, 6-quasiparticle state with configuration= $\nu[(9/2[505])(11/2[615])(7/2[514])(7/2[633])]\otimes\pi[(9/2[514])(3/2[532])]$ (1988Ch27).
6584.5@ 12	(24)+	D		J π : $\Delta J=2$ γ to (22)+.
6591.7 ^d 18	(24)-	D		
6766.1 ^h 19	23-	D		
6860.3 ^s 11	26+	D		J π : $\Delta J=2$ γ to 24+.
6861.9 ^p 4	(24+)	E		
6897.2 ^{&} 13	(25)+	D		J π : $\Delta J=2$ γ to (23)+.
6900.7 5	(24)	E		
6927.2 ^e 19	(25)-	D		
6978.4 ^l 18	25-	D		
7049.5 ^b 4	(25+)	E	150 ns 10	$\mu=+10.63$ 20 (1989Al19,2014StZZ). Q=4.2 2 (1991Br25,2013StZZ,2014StZZ). μ : from g factor=+0.425 8 ($\gamma(\theta, H, t)$ 1989Al19). Q: observation of time dependent quadrupole interaction pattern of γ radiation (TDPAD) (1991Br25). J π : $\Delta J=1$, (M1+E2) γ to 24+; $\Delta J=2$ γ to (23+); possible K π =25+, 6-quasiparticle state with configuration= $\nu[(9/2[624])(7/2[633])(7/2[503])(7/2[514])]\otimes\pi[(9/2[514])(11/2[505])]$ (1989Al19,1988Ch27). This gives g factor=0.38, in agreement with the measured value. T _{1/2} : from $\gamma\gamma(t)$ in ($^{36}\text{S}, 4n\gamma$) (1989Al19). Other: 130 ns 20 (1988Ch27).
7399.1@ 16	(26)+	D		J π : $\Delta J=2$ γ to (24)+.
7485.4 ^c 9	(26+)	E		
7792.9 ^l 21	27-	D		
7804.4 ^s 15	28+	D		J π : $\Delta J=2$ γ to 26+.
7821.2 ^{&} 17	(27)+	D		
7925.5 ^b 9	(27+)	E		
8267.1@ 19	(28)+	D		
8346.4 ^c 11	(28+)	E		
8698.4 ^l 23	29-	D		
8699.5 ^b 11	(29+)	E		
8803.3 ^{&} 20	(29)+	D		
8819.8 ^s 18	30+	D		
9103.2 ^c 12	(30+)	E		
9192.1@ 21	(30)+	D		
9596.1 ^b 13	(31+)	E		
9690.9 ^l 25	31-	D		
9816.3 [?] 22	(31)+	D		
9913.0 ^s 21	32+	D		

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Adopted Levels, Gammas (continued)

182Os Levels (continued)

E(level) [†]	Jπ [‡]	XREF	E(level) [†]	Jπ [‡]	XREF
9939.7 ^c 14	(32+)	E	12371.6 ^c 20	(38+)	E
10178.1 [?] @ 24	(32+)	D	13482 [?] § 3	(38+)	D
10510.0 ^b 15	(33+)	E	x ^r		D
10780.5 ^c 15	(34+)	E	597.8+x ^r 10		D
10853.3 [?] & 24	(33+)	D	1249.2+x ^r 15		D
11071.0 [§] 23	34+	D	1969.2+x ^r 18		D
11307.7 ^b 16	(35+)	E	2783.7+x ^r 20		D
11560.6 ^c 17	(36+)	E	3689.2+x ^r 23		D
12098.7 ^b 19	(37+)	E	4681.7+x ^r 25		D
12265.0 [§] 25	36+	D			

[†] From least-squares fit to E_γ data, assuming Δ(E_γ)=1 keV when not stated.

[‡] For high-spin (J>6), the assignments are generally based on γ(θ), γγ(θ) data, ce and/or lin pol data for selected transitions, and band associations. Ascending order of spins is assumed, as the excitation energy rises. Based on RUL, all ΔJ=2, Q transitions are assumed as E2 and ΔJ=1 or 0, D+Q with significant admixtures as M1+E2. When no arguments are given, the assignments are implied from band associations suggested by long cascades of gamma transitions.

§ (A): Kπ=0+, g.s. band. Pronounced crossing near J=10 at a rotational frequency of ≈0.26 MeV where it changes to AB configuration.

(B): Kπ=2+, γ band.

@ (C): Kπ=2+, βc band, α=0. Since this band decays to g.s. band, a low K-value is assigned even though members with J<8 are not reported. At low spins, the band starts as a tilted-axis band; with increasing spin the configuration becomes BC. Upbend near J=22 at ħω=0.38 MeV caused by AD crossing.

& (D): Kπ=2+, Ac band, α=1. Since this band decays to g.s. band, a low K-value is assigned even though members with J<8 are not reported. At low spins, the band starts as a tilted-axis band; with increasing spin the configuration becomes BC.

a (E): Kπ=16+, 4-qp band. Configuration=(ν7/2[514]ν9/2[624])⊗(π5/2[402]π11/2[505]) or (ν9/2[505]ν9/2[624])⊗(ν7/2[514]ν7/2[633]) (1988Ch27).

b (F): Kπ=25+ band, α=1. Band based on isomer (2003Pa39).

c (G): Kπ=25+ band, α=0. Band based on isomer (2003Pa39).

d (H): Kπ=8-, ν9/2[624]⊗ν7/2[514], α=0. No signature splitting. Band crossing at a rotational frequency of ≈0.30 MeV which can be caused by AD and BC crossings. Possible 2-quasiproton admixture<8%.

e (I): Kπ=9-, ν9/2[624]⊗ν7/2[514], α=1. No signature splitting. Possible 2-quasiproton admixture<8%.

f (J): Kπ=14-, 4-qp band. Configuration=(ν7/2[514]ν9/2[624])⊗(π9/2[514]π3/2[532]) (1988Ch27).

g (K): Kπ=2-, 3- band; α=0. Configuration=π(1/2[541]⊗5/2[402])(K=3) + ν(9/2[624]⊗5/2[512]) (K=2) from consistency of averaged g_K=0.9 2 and β(M1)/B(E2) ratios. Band crossing near J=14 at ħω=0.28 MeV.

h (L): Kπ=2-, 3- band; α=1. Configuration=π(1/2[541]⊗5/2[402])(K=3) + ν(9/2[624]⊗5/2[512]) (K=2) from consistency of averaged g_K=0.9 2 and β(M1)/B(E2) ratios. Band crossing near J=14 at ħω=0.28 MeV.

i (M): Band based on 3-, α=1. At low spins, possible K=2-, 3- octupole vibrations. At higher spins, configuration=ν(7/2[514]⊗9/2[624]) or ν(1/2[521]⊗9/2[624]) with possible admixture (≤10%) of π(9/2[514]⊗5/2[402]). Upbend occurs near J=19 at a rotational frequency of ≈0.36 MeV.

j (N): Band based on 6-, α=0. At low spins, possible K=2-, 3- octupole vibrations. At higher spins, configuration=ν(7/2[514]⊗9/2[624]) or ν(1/2[521]⊗9/2[624]) with possible admixture (≤10%) of π(9/2[514]⊗5/2[402]) (Kπ=2-). Upbend occurs near J=14 at a rotational frequency of ≈0.28 MeV.

k (O): Band based on (17-), α=1.

l (P): Band based on 5-, α=1. At low spins, possible K=2-, 3- octupole vibrations. At higher spins, possible configuration=ν(9/2[624]⊗5/2[512]). Band crossing occurs near J=15 at a rotational frequency of ≈0.28 MeV; which is due to possible BC crossing.

m (Q): Band based on (6-), α=0. At low spins, possible K=2-, 3- octupole vibrations. At higher spins, possible configuration=ν(9/2[624]⊗5/2[512]).

n (R): Band based on 12+, α=0. Possible configuration=π1/2[541]⊗π9/2[514] or ν9/2[624]⊗ν7/2[633] (1982Li04).

o (S): ΔJ=(2) cascade.

p (T): ΔJ=(2) cascade.

q (U): ΔJ=(2) cascade.

r (V): ΔJ=(2) cascade.

γ(182Os)

In ¹⁵⁰Nd(³⁶S,4nγ):delayed γ' dataset, 106 γ rays from 175 to 1500 keV remain unplaced in a level scheme.

E(level)	E _γ [†]	I _γ [†]	Mult. [§]	δ [§]	α	Comments
126.89	126.9 1	100	E2		1.70	B(E2)(W.u.)=126 3.
400.29	273.5 1	100	E2		0.1210	
794.00	393.8 1	100	E2		0.0422	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [§]	$\delta^{\S}$	α	Comments
890.61	763.7 1	100 4	E2+M1 (+E0)	-10 +3-11	0.00878 19	Mult., δ : from $\gamma\gamma(\theta)$ in ^{182}Ir ϵ decay (1994Ki01). E0 component is small as indicated by $\alpha(\text{K})_{\text{exp}}=0.0095\ 20$ (2007Ca04).
1039.04	890.6 1	95 3	E2		0.00627	
	148.1 $\frac{7}{2}$ 3	0.42 19	[M1, E2]		1.4 5	
	638.7 $\frac{7}{2}$ 1	16.3 8	(E2)		0.01280	$\delta(\text{E2/M1})\geq 68$ (from $\gamma\gamma(\theta)$ in ^{182}Ir ϵ decay (1994Ki01)).
1159.88	912.1 1	100 3	E2+M1	+5.6 3	0.00623 10	Mult., δ : from $\gamma\gamma(\theta)$ in ^{182}Ir ϵ decay (1994Ki01).
	759.6 2	70 5				
1190.30	1033.0 2	92 4	E0+M1+E2		0.064 8	Total conversion coefficient from $\alpha(\text{K})_{\text{exp}}=0.053\ 8$ (2007Ca04), multiplied by a factor of 1.2 to account for other shells.
	1159.9 2	100 5				
1190.30	299.8 $\frac{7}{2}$ 3	4.6 8	[E2]		0.092	
	790.0 1	100 5	E2+M1	-7.6 +15-27	0.00825 17	Mult., δ : from $\gamma\gamma(\theta)$ in ^{182}Ir ϵ decay (1994Ki01).
	1063.4 1	54.2 21	(Q)			
1277.90	483.8 2	100	E2		0.0247	
1378.25	218.5 3	5.4 16	[E2]		0.247	
	584.3 3	15 3	[E2]		0.01569	
	977.7 2	24.6 22	E0+M1+E2		0.16 2	δ : -11 +4 from $\gamma\gamma(\theta)$ (1994Ki01), lower uncertainty not given by 1994Ki01. Evaluators' estimate from A_2 and A_4 values of 1994Ki01 gives -2.5 $>\delta>$ +0.45. Total conversion coefficient from $\alpha(\text{K})_{\text{exp}}=0.13\ 2$ (2007Ca04), multiplied by a factor of 1.2 to account for other shells.
1393.18	1251.4 1	100 4				
	993.3@ 3	9 3				
	1266.3 1	100 6	(E0+E2+M1)			$q^2(\text{E0/E2})=4.4\ 12$, $X(\text{E0/E2})=0.31\ 8$ (2007Ca04, from ϵ decay). Mult.: E0+(M1)+E2 or abnormal M1+E2.
1399.47	1393.1 3	12 3				
	360.0 3	11 4	[E2]		0.0538	
	605.2 $\frac{7}{2}$ 3	11.2 24	[M1, E2]		0.027 13	
	999.12 15	100 5	E2+M1	+19 +8-4	0.00499	δ : from $\gamma\gamma(\theta)$ in ^{182}Ir ϵ decay (1994Ki01).
1471.76	281.5 $\frac{7}{2}$ 3	8.5 21	[E1]		0.0285	
	432.7 2	47 5	(D)			
	581.1 2	100 6				
	1071.8 6	19.6 15	(D)			
1522.73	1344.9 $\frac{7}{2}$ @ 3	10.4 6				
	332.0 3	30 4				
	483.8 2	46 6				
	632.0 2	100 13				
	1122.5 3	40 6				
1537.39	1396.0 2	54 8				
	498.3 3	28 7				
1588.54	646.8 2	100 10				
	398.3 $\frac{7}{2}$ 3	68 17	[E2]		0.0409	
1617.42	794.6 3	100 24				
	1188.2 3	54 17				
	1217.2 1	100 5	(E0+M1+E2)			Mult.: M1 or E0+(M1)+E2. $q^2(\text{E0/E2})=1.9\ 7$, $X(\text{E0/E2})=0.12\ 5$ (2007Ca04, from ϵ decay).
1627.41	1490.2 2	21.1 21				
	227.9 3	20 4				
	437.2 3	13 4				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [§]	$\delta^{\S}$	α	Comments
1627.41	588.3 2	100 10				
	1227.2 2	75 5				
1640.89	450.8 2	80 16				
	601.7 2	81 11				
	750.2 2	100 10				
	1240.6 3	40 6				
	1514.0 2	90 9				
1654.15	182.4 2	70 8	[E2]		0.456	
	254.6 3	19 5	[E1]		0.0363	
	463.8 3	37 5				
	860.1 3	52 7	(E1)		0.00258	
	1253.8 2	100 9	E1		1.34×10^{-3}	
1669.42	197.6 3	82 20				
	478.9 3	100 16				
	630.2 3	98 15				
	875.8 3	33 9				
	1269.2 3	78 20				
1676.59	1549.7 2	100 10				
	1676.7 [@] 3	25 6				
1734.85	544.4 2	100 10	(D)			
	941.2 [‡] 3	28 8				
	1334.6 3	100 50	(D)			
1756.41	102.1 3	100 18	(M1+E2)	-0.4 3	5.1 3	
	962.4 3	100 36	(D)			
1768.89	1642.0 2	100 5				
	1769.0 [@] 3	48 7				
1785.48	386.1 3	26 8				
	595.1 3	66 10				
	746.2 3	100 11				
	1385.4 3	66 10				
1801.30	401.0 3	100 50				
	611.4 3	57 21	(D)			I γ : from 1982Li04. Other: 100 29 (1995Ku14).
	762.6 3	43 21	D			I γ : from 1982Li04. Other: 71 19 (1995Ku14).
1812.00	534.0 2	100	Q			
1813.3?	159.2 [@] 3	100				
1831.4	553.5 2	100	E1		0.00618	B(E1)(W.u.)= 1.59×10^{-12} 15.
1844.40?	1444.1 [@] 2	100				
1853.1	453.8 4	≤ 20				
	1059.1 4	100 20	D+Q			
1876.43	249.1 3	100 13				
	837.3 3	92 8				
1878.63	122.2 3	100 20	D+Q	-0.5 3		
	224.4 3	64 12	Q			I γ : from 1995Ku14. Other: 88 19 (1982Fa01), 44 17 (1982Li04).
	599	36 12				
	1085.4 4	48 16	D			E γ : from 1982Fa01. Other: 1084.4 (1995Ku14).
						I γ : from 1995Ku14. Other: 38 19 (1982Fa01).
1891.4	491.7 4	100				
1895.48	94.0 3	23 9	(D+Q)	$\geq +0.1$		
	705.2 3	100 14	E1		0.00378	
	1101.6 3	53 11	(E1)		1.63×10^{-3}	
	1495.1 3	114 36				
1899.21	1008.6 3	40 7				
	1498.9 3	100 9				
2013.9	182.6 3	100	D+Q			
2016.67	282.1 6	78 16	(Q)			I γ : other: ≤ 17.2 (1982Fa01).
	428.3 4	53 26	(D)			I γ : other: 14 5 (1982Fa01).
	738.6 3	41 11	E1		0.00345	
	1223.3 6	100 28	E1		1.38×10^{-3}	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [§]	$\delta^{\S}$	α	Comments
2025.08	129.6 3	100 15	D+Q	+0.15 5		δ : weighted average of values from 1982Fa01 and 1982Li04.
	223.9 3	50 20				
2025.09	985.7 3	82 18				
	1134.8 3	100 20				
2035.37	156.9 4	76 15	(D+Q)			
	278.9 2	100 17	Q			
2059.5?	405.4 [@] 3	100				
2112.61	834.7 3	100 14	M1		0.01772	
	1318.4 3	17 11	(Q)			I γ : other: <100 (1988Ch27).
2147.45	1353.5 3	60 16				
	1747.1 3	100 16				
2181.8	156.8 5	75 17	(D+Q)			
	286.2 3	100 14	Q			
2193.4	158.0 3	28 5	D+Q	-0.16 13		
	314.8 2	100 10	Q			
2220.0	206.2 2	100 7	D+Q	-0.9 1		
	388.8 4	75 12	Q			I γ : other: 137 20 (1982Li04).
2235.0	343.5 2	100 15	Q			
	382.0 4	32 9	D			
	958.0	14 6				
2245.7	133.0 2	100	M1 (+E2)	-0.06 19	2.48 7	
2346.1	534.0 2	100	Q			
2371.5	189.9 3	96 14	D+Q	+0.14 5		
	346.5 3	100 14	Q			
2374.86	562.8 3	80 12	(D(+Q))	+0.2 3		
	1097.1 2	100 12	E2		0.00414	
2380.8	364.2 2	100 16	Q			
	1102.7 3	18 6				
2419.6	226.2 3	29 6	D+Q	-0.5 4		
	384.2 2	100 11	Q			
2449.2	229.2 2	80 8	D+Q	-0.4 1		δ : from 1982Li04. Other: -0.56 +34-22 (1982Fa01).
	435.2 2	100 10	Q			
2526.5	151.9 3	52 15	(D+Q)			I γ : other: 130 45 (1982Li04).
	280.7 2	100 20	(Q)			
2583.2	211.9 3	71 10	D+Q	+0.20 8		I γ : from 1982Li04 and 1995Ku14. Other: 52 6 (1982Fa01).
						δ : weighted average of +0.11 6 (1982Li04) and +0.27 5 (1982Fa01).
	401.3 2	100 18	Q			
2591.4	172.2 4	6.8 22	(D+Q)			I γ : other: 22 4 (1982Fa01).
	398.0 2	100 14	Q			
2651.9	416.9 2	100	(Q)			
2671.9	325.8 2	31 8	(D+(Q))	-0.14 22		I γ : from 1982Li04 and 1995Ku14. Other: 100 10 (1982Fa01).
	859.9 2	100 16	(E2)		0.00674	
2700.3	251.2 3	52 6	D+Q	-0.42 +28-1	5	I γ : from 1982Li04 and 1995Ku14. Others: 71 6 (1982Fa01), 100 (1988Ch27).
	480.4 2	100 18	(Q)			
2803.5	457.5 3	84 19	(D+Q)	-0.5 4		
	991.4 3	100 18	(Q)			
2818.8	235.4 3	61 13	D+Q	+0.13 7		δ : weighted average of +0.08 6 (1982Li04) and +0.23 8 (1982Fa01).
	447.4 3	100 12	Q			
2824.1	443.3 2	100	Q			
2840.7	494.4 2	100	Q			
2869.9	198.2 3	30 5	(D+Q)			I γ : from 1982Li04, 1988Ch27 and 1995Ku14. Other: 72 18 (1982Fa01).
	343.4 2	100 15	Q			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [§]	$\delta^{\S}$	α	Comments
2908.5	317.8 4	9 3				$E\gamma$: from 1982Fa01. Other: 316.1 (1995Ku14). $I\gamma$: from 1995Ku14. Other: 45 6 (1982Fa01).
	488.9 2	100 17	Q			
2972.5	272.2 3	38 4	D+Q			$I\gamma$: from 1982Fa01 and 1995Ku14. Other: 100 47 (1982Li04).
	523.1 2	100 10	Q			
3071.9	253.0 3	50 7	D+Q	+0.07 4		
	488.7 2	100 16	Q			
3072.1	480.6 2	100	Q			
3073.1	232.4 3	26 4	(D+Q)	-0.4 1		
	401.1 5	34 7				$I\gamma$: from 1995Ku14. Others: ≈ 18.5 (1982Fa01), 60 17 (1982Fi04) and 100 (1988Ch27).
	727.0 3	100 12	E2		0.00961	$I\gamma$: from 1982Fa01, 1982Li04 and 1995Ku14. Other: <50 (1988Ch27).
3133.0	481.1	100	Q			
3189.2	537.3 4	100 56	(Q)			
3264.9	292.2 3	28 5	D(+Q)	-0.07 8		
	564.7 2	100 16	Q			
3291.2	450.3 3	57 12	(D+Q)	-0.6 2		
	487.8 3	100 20	Q			
	945.2 3	40 11	E2		0.00556	$I\gamma$: other: $I\gamma(945)/I\gamma(488)=100\ 23/\leq 38$ (1982Fa01).
3304.1	230.8 5	15 4				
	434.4 2	100 17	Q			
3320.1	479.4 2	100	Q			
3330.5	258.8 3	98 23	(D+Q)	+0.26 6		
	511.7 3	100 20				
3338.0	513.9 2	100	Q			
3489.4	417.2 2	9 3				$I\gamma$: other: $I\gamma(417)/I\gamma(581)=100\ 9/57\ 18$ (1982Fa01).
	580.9 2	100 11	Q			$I\gamma$: from 1982Li04 and 1995Ku14. Other: 57 18 (1982Fa01).
3573.4	308.6 3	17 3	D(+Q)	-0.05 9		$I\gamma$: other: 50 17 (1982Li04).
	600.9 2	100 15	Q			
3615.8	286	74 24				
	543.8 3	100 15	Q			
3617.6	544.5 2	100 13	Q			
	776.8 2	78 12	Q			$I\gamma$: from 1982Fa01, 1982Li04 and 1988Ch27. Other: 54 8 (1995Ku14).
3639.7	567.7 4	100	(Q)			
3644.4	1195.5 5	100				
3669.6	536.6	100				
3840.8	223.0 3	26 6				
	536.8 2	100 16	Q			$E\gamma$: not seen by 1982Li04.
3850.2	530.0 3	39 8	(D+Q)	-0.6 4		$I\gamma$: other: 11 6 (1982Li04).
	559.0 4	100 14	Q			
	1009.4 3	61 24	(Q)			$I\gamma$: other: 19 6 (1982Li04).
3857.2	537.0 2	100	Q			
3899.6	283.3	38 6				
	570.0	100 19	Q			
3903.7	330.2 4	19 4	(D+Q)	-0.3 2		
	638.8 2	100 11	Q			
3905.5	567.4 4	100				
3915.7	1075.0 5	100				
3929.9	1089.3 2	100	(M1+E2) [#]	-1.0 +3-6		δ : from $^{150}\text{Nd}(^{36}\text{S},4n\gamma)$:delayed.
3969.4	325.3 5	100				
4058.1	568.7 [@] 4	100				
4070.9	581.5 5	100	Q			
4157.6	1316.8 5	100	Q			
4166.4	1325.7 2	100	Q			

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [§]	$\delta^{\S}$	α	Comments
4185.3	286	83 27				
	569.4 5	100 19	Q			
4211.0	241.6 2	100				
4237.3	663.9 3	100	Q			
4255.5	585.9	100				
4275.3	657.6 2	100 16	Q			
	955.2 3	29 5				
4293.6	653.9 3	100	(Q)			
4356.3	285.5	100	D			
4370.3	159.3 2	100	(E1) #		0.1183	B(E1)(W.u.)=6.8×10 ⁻⁶ 25. B(E2)(W.u.)<5×10 ⁻⁵ .
	1529.5 5	<33				
4425.7	259.4 5	<33				
	495.8 2	100	Q			
	509.9 5	67				
4437.3	1117.3 5	100				
4466.9	561.4 3	100	Q			
4467.9	610.7	28 7				
	617.7 2	100 15	Q			
4476.4	635.6 3	100	Q			
4480.3	623.1 2	100	Q			
4480.9	295.5	44 11				
	581.3	100 24	Q			
4516.3	305.0 5	100				
	547.0 5	<50				
4598.3	694.6 2	100	Q			
4639.2	283.1	35 11	D			
	568.3 3	100 18				
4682.5	312.3 2	100				
4713.3	287.8 5	17				
	546.8 2	100				
	555.7 2	42				
4761.2	323.7 5	<100				
4766.6	581.3 3	100	Q			
4879.5	363.0 5	<100				
	668.6 5	<100				
4907.6	268.6	58 16	D			
	551.2	100 19	Q			
4940.8	703.5 5	100	Q			
5005.2	322.8 5	<100				
	635.0 5	<30				
5008.0	540.7	100				
5012.0	718.8	100				
5024.4	749.1 2	100	Q			
5024.5	311.0 5	<8				
	598.8 2	100	Q			
5063.3	302.1 2	100				
	626.0 2	100				
5127.7	646.8	100				
5142.0	673.8 4	100	Q			
5180.7	301.2 2	100				
5192.3	711.9 2	100	E2			
5205.4	729.0 5	100	Q			
5246.1	647.8	100				
5257.3	618.1	100				
5332.8	327.6 5	<100				
	650.5 5	5				
5358.1	334.0 5	<8				
	644.9 2	100				
5383.7	617.1	100				
5485.8	305.0 5	100				
5505.4	597.8	100	Q			
5587.4	646.6	100				
5607.0	595.3	49 15				

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [§]	$\delta^{\S}$	α	Comments
5607.0	598.7	100 32	Q			
5674.6	611.3 2	100				
5713.5	355.6 5	14				
	689.1 2	100	Q			
5726.1	714.1	100				
5777.8	292.0 2	100				
	635.5 5	<100				
5810.4	786.0 5	100				
5858.7	612.6	100				
5983.2	205.3 2	100	(M1+E2) #			
	650.5 2	82	Q			
5987.6	795.2 3	100	Q			
6017.4	812.0 5	100	Q			
6047.8	664.1	100				
6088.6	375.0 5	<10				
	730.5 2	100				
6219.4	632.0	100				
6258.4	651.4	100	Q			
6281.7	298.5 2	100	(M1+E2) #		0.18 9	
6322.6	648.0 2	100				
	1130.2 5	7				
6483.6	770.2 2	100				
6543.7	262.0 2	100	(M1+E2) #		0.26 12	
	830.1 2	47	Q			
6584.5	774.1	100	Q			
6591.7	733	100				
6766.1	718.3	100				
6860.3	872.7	100	Q			
6861.9	318.2 2	33				
	773.3 2	100				
6897.2	879.8	100	Q			
6900.7	812.2 5	100				
6927.2	707.8	100				
6978.4	720.0	100				
7049.5	148.9 5	<3	[D+Q]		1.0 9	
	187.5 2	26	(M1+E2)		0.7 3	
	505.6 2	100	Q			B(E2)(W.u.)=0.00073.
	566.0 2	23				B(E2)(W.u.)=9.5×10 ⁻⁵ .
	726.9 2	83				B(E2)(W.u.)=9.8×10 ⁻⁵ .
1061.6 5		6	(M1+E2) #	-1.9 +9-12		B(E2)(W.u.)=8.4×10 ⁻⁷ ;
						B(M1)(W.u.)=6×10 ⁻¹⁰ .
						δ : from $^{150}\text{Nd}(^{36}\text{S},4n\gamma)$:delayed.
7399.1	814.6	100	Q			
7485.4	436	100				
7792.9	814.5	100				
7804.4	944.1	100	Q			
7821.2	924	100				
7925.5	440					
	876					
8267.1	868	100				
8346.4	421					
	861					
8698.4	905.5	100				
8699.5	353					
	774					
8803.3	982	100				
8819.8	1015.4	100				
9103.2	404					
	757					
9192.1	925	100				
9596.1	493					
	896					
9690.9	992.5	100				

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Os})$ (continued)

E(level)	$E\gamma^\dagger$	$I\gamma^\dagger$	E(level)	$E\gamma^\dagger$	$I\gamma^\dagger$
9816.3?	1013@	100	12098.7	538@	
9913.0	1093.2	100		791	
9939.7	343		12265.0	1194	100
	837		12371.6	273@	
10178.1?	986@	100		811	
10510.0	570		13482?	1217@	100
	914		x	252.9	
10780.5	270			540.7	
	841			663.8	
10853.3?	1037@	100	597.8+x	597.8	
11071.0	1158	100	1249.2+x	651.4	
11307.7	527		1969.2+x	720.0	
	798		2783.7+x	814.5	
11560.6	253		3689.2+x	905.5	
	780		4681.7+x	992.5	

[†] Weighted averages of all available values from different datasets, unless otherwise stated.

[‡] Reported only in ^{182}Ir ϵ decay (15 min).

[§] For low spin ($J \leq 6$), the assignments are mostly from $\gamma\gamma(\theta)$ and ce data. For high-spin ($J > 6$) states, the assignments are from $\gamma(\theta)$ and ce data in $^{168}\text{Er}(^{18}\text{O}, 4n\gamma)$; $\gamma(\theta)$ data in $^{170}\text{Er}(^{16}\text{O}, 4n\gamma)$ and $\gamma\gamma(\theta)(\text{DCO})$ data in $^{150}\text{Nd}(^{36}\text{S}, 4n\gamma)$. Exceptions are noted.

Based on RUL, all $\Delta J=2$, Q transitions are assumed as E2 and $\Delta J=1$ or 0, D+Q with significant admixtures as M1+E2.

[#] From $^{150}\text{Nd}(^{36}\text{S}, 4n\gamma)$:150 ns isomer (1988Ch27).

@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)(A) $K\pi=0+, g.s.$
band.(B) $K\pi=2+, \gamma$ band.(C) $K\pi=2+, \beta c$ band, $\alpha=0$.(D) $K\pi=2+, A c$ band, $\alpha=1$.

Adopted Levels, Gammas (continued)(E) $K\pi=16+$, 4-qp band.(F) $K\pi=25+$ band, $\alpha=1$.(G) $K\pi=25+$ band, $\alpha=0$.(H) $K\pi=8-$,
 $\nu 9/2[624] \otimes \nu 7/2[514]$, $\alpha=0$.

Adopted Levels, Gammas (continued)

(I) $K\pi=9-$,
 $\nu 9/2[624] \otimes \nu 7/2[514], \alpha=1.$

(J) $K\pi=14-, 4\text{-qp band}.$

(K) $K\pi=2-, 3- \text{ band; } \alpha=0.$

(L) $K\pi=2-, 3- \text{ band; } \alpha=1.$

Adopted Levels, Gammas (continued)(M) Band based on 3-, $\alpha=1$.(N) Band based on 6-, $\alpha=0$.(O) Band based on
(17-), $\alpha=1$ (P) Band based on 5-, $\alpha=1$. $^{182}_{76}\text{Os}_{106}$

Adopted Levels, Gammas (continued)(Q) Band based on (6-), $\alpha=0$.(R) Band based on 12+, $\alpha=0$.(S) $\Delta J=2$ cascade(T) $\Delta J=2$ cascade

Adopted Levels, Gammas (continued)

 (U) $\Delta J=(2)$ cascade

 (V) $\Delta J=(2)$ cascade

Adopted Levels, Gammas

Q(β⁻)=-2883 25; S(n)=7650 30; S(p)=2790 30; Q(α)=4180 30 2012Wa38.

S(2n)=17220 30, S(2p)=7792 30, Q(εp)=180 24 (2012Wa38).

1990Kr13: analyzed band structures.

First identification of ¹⁸²Ir by 1961Di04.

¹⁸²Ir Levels

Cross Reference (XREF) Flags

A ¹⁸²Pt ε Decay (2.67 min)
B ¹⁸⁶Au α Decay (10.7 min)
C ¹⁷²Yb(¹⁴N,4nγ)

E(level)	Jπ [†]	XREF	T _{1/2} [‡]	Comments
0.0§	3+	ABC	15.0 min 10	%ε+%β ⁺ =100. μ=+2.6 2 (2006Ve10,2014StZZ). Q=-1.7 6 (2006Ve10,2013StZZ,2014StZZ). (<r ² >) ^{1/2} (rms charge radius)=5.37 fm 11 (2013An02,evaluation). Jπ,μ,Q: from LASER spectroscopy COMPLIS experiment at ISOLDE facility at CERN (2006Ve10, also 2000Ve10,2000Sa58). Other: μ=2.28 8 (1992Bo39), on-line nuclear orientation. 2006Ve10 provide detailed comparison of experimental quadrupole moment with that from model calculations. The results agree with mixed Kπ=0+ and 1+ prolate (β ₂ =+0.20) configuration= v1/2[521]⊗π1/2[541] E(level): it is assumed that the lowest state populated in the (¹⁴ N,4nγ) reaction is the ground state. In a recent study of ¹⁸² Ir ε decay, the 15-min activity of ¹⁸² Ir was produced by a similar heavy-ion reaction: ¹⁶⁸ Er(¹⁹ F,5n) at 106 MeV. Thus it is likely that the g.s. is the bandhead of the decoupled band. T _{1/2} : From weighted average of 15 min 1 (1972Ak03), 15.0 min 15 (1971Na27), 15 min 1 (1961Di04). Others: 16.7 min 19 (1972HuZL), 15.5 min 25 (1971Na27).
8.1? 4		A		E(level): ordering of 8.1-374.1γ cascade is not established.
25.89§ 18	(5)+	A C		Jπ: E2 γ to 3+; band assignment.
71.02# 17	(5)+	A C	170 ns 40	Jπ: M1+E2 γ to (5)+, γ to 3+; band assignment.
74.82§ 13	(2)+	A		Jπ: M1+E2 γ to 3+; M1(+E2) γ from 1+.
87.38§ 13	(1,2)+	A		Jπ: E2 γ to 3+; M1(+E2) γ from 1+; band assignment favors J=1.
88.8# 3	(4)+	A		Jπ: M1 γ to (5)+; band assignment.
95.07§ 16	(4)+	A		Jπ: M1+E2 γ to (5)+, M1(+E2) γ to 3+; band assignment.
109.9# 3	(6+)	C		Jπ: (M1) γ to (5)+.
152.23 17	(1,2)-	AB		XREF: B(?). Jπ: E1 γ to (2)+; E1 from 1+. Possible configuration=Kπ=2-, π3/2[402]⊗v1/2[521].
152.44@ 15	(4)-	A C		Jπ: E1 γs to (5)+ and (4)+, γ to 3+. Possible configuration=Kπ=4-, π1/2[541]⊗v9/2[624] + π1/2[541]⊗v7/2[633].
171.4§ 3	(7+)	C		Jπ: (E2) γ to (5)+.
174.48 18	(3)-	A		Jπ: M1 γ to (4)-; possible configuration= Kπ=3-, π1/2[541]⊗v7/2[633] + π3/2[532]⊗v9/2[624].
176.4 3	(6-)	C	130 ns 50	Jπ: (E1) γ to (5)+.
185.8# 4	(7+)	C		Jπ: (γ to (6)+).
190.37# 19	(3)+	A		Jπ: M1(+E2) γ to (4)+; γ from 1+.
194.36 19	(1,2)+	A		Jπ: M1(+E2) γ to (1,2)+; (M1) γ from 1+.
199.8 4	(0 to 3)-	A		Jπ: M1 γ to (1,2)-; possible configuration= π3/2[402]⊗v1/2[521],Kπ=1- for Jπ=3-.
210.97§ 15	1+	A		Jπ: strong (allowed) ε+β ⁺ feeding from 0+ with log ft=4.7.
231.6@ 3	(6-)	C		Jπ: (M1) γ to (6-); (E2) γ to (4)-.
255.1 4	0+, 1+, 2+	A		Jπ: M1 γ to 1+.
259.60 17	(2)+	A		Jπ: M1(+E2) γ to (2)+; M1(+E2) γ from 1+.
266.6@ 5	(7-)	C		Jπ: (M1) γ to (6-).
283.80§ 18	(2)+	A		Jπ: M1(+E2) γ to 3+, M1(+E2) γ from 1+.
292.2# 4	(8+)	C		Jπ: γs to (6+) and (7+).
320.93 17	(2)-	A		Jπ: E1 γ to and from 1+; M1 γ to (3)-. Possible configuration=Kπ=2-, π5/2[402]⊗v1/2[521].
341.66§ 21	(2,3,4)+	A		Jπ: M1,E2 γ to (2)+, γ to (4)+; band assignment favors 3+.
345.67 19	(2)-	A		Jπ: E1 γ from 1+; M1+E2 γ to (2)-; γ to (3)-. Possible configuration=Kπ=2-, π3/2[532]⊗v7/2[633].

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}Ir Levels (continued)

E(level)	$J\pi^\dagger$	XREF	Comments
346.7@ 5	(8-)	C	$J\pi$: γ to (7-).
377.06 22	(2)+	A	$J\pi$: M1(+E2) γ from 1+; M1(+E2) γ to (3)+. Possible configuration= $K\pi=2+$, $\pi 3/2[532] \otimes v7/2[514]$.
382.16 15	(3)+	A	$J\pi$: M1+E2 γ to 3+; E1 γ to (4)-; γ from 1+. Possible configuration= $K\pi=3+$, $\pi 1/2[541] \otimes v5/2[512]$.
426.0# 4	(9+)	C	$J\pi$: $\Delta J=(2)$ γ to (7+); γ to (8+).
439.4§ 4	(9+)	C	$J\pi$: $\Delta J=(2)$ γ to (7+); γ to (8+).
452.50 16	(2)+	A	$J\pi$: M1 γ to (3)+, E1 γ to (3)-; M1(+E2) γ from 1+. Possible configuration= $K\pi=2+$, $\pi 1/2[541] \otimes v5/2[512]$.
458.30 25	(2,3,4)+	A	$J\pi$: M1(+E2) γ to (3)+.
519.8@ 5	(9-)	C	$J\pi$: $\Delta J=1$, (M1+E2) γ to (8-); $\Delta J=(2)$ γ to (7-).
590.7# 4	(10+)	C	$J\pi$: $\Delta J=1$ γ to (9+); γ to (8+).
615.21 24	(2,3)+	A	$J\pi$: M1+E2 γ to (3)+; γ from 1+.
632.4@ 5	(10-)	C	$J\pi$: $\Delta J=1$, (M1+E2) γ to (9-); γ to (8-).
636.87 16	(1,2)+	A	$J\pi$: M1(+E2) γ to (2)+; M1(+E2) γ from 1+.
662.70 17	(1,2)+	A	$J\pi$: M1(+E2) γ to (2)+; M1(+E2) γ from 1+. Possible configuration= $\pi 3/2[532] \otimes v5/2[512]$.
776.3# 4	(11+)	C	$J\pi$: γ_8 to (9+) and (10+).
782.9 3	(1,2)+	A	$J\pi$: M1(+E2) γ to (2)+; M1(+E2) γ from (1)+.
807.0§ 4	(11+)	C	$J\pi$: $\Delta J=(2)$ γ to (9+).
852.8 3	(3)+	A	$J\pi$: M1(+E2) γ to (2)+; (E2) γ to (5)+.
904.1 3	(1,2,3)+	A	$J\pi$: M1(+E2) γ to (2)+.
907.5@ 6	(11-)	C	
922.7 4	(0- to 4-)	A	$J\pi$: γ to (2)-.
985.3# 4	(12+)	C	$J\pi$: $\Delta J=(2)$ γ to (10+).
1002.34 14	1+	A	$J\pi$: M1 γ to 1+; E1 γ to (2)-; allowed $\varepsilon+\beta^+$ feeding from 0+ with $\log ft=5.3$.
1024.85 16	(1)+	A	$J\pi$: E1 γ to (2)-; M1 γ to (2)+; probable allowed $\varepsilon+\beta^+$ feeding from 0+ with $\log ft=5.7$.
1039.0@ 6	(12-)	C	$J\pi$: $\Delta J=(2)$ γ to (10-); γ to (11-).
1135.66 23	(1,2)+	A	$J\pi$: E1 γ to (2)-; M1 γ to 1+; 1+ favored by possible β feeding from 0+.
1212.1# 5	(13+)	C	
1248.3§ 5	(13+)	C	
1408.6@ 6	(13-)	C	
1456.8# 5	(14+)	C	
1540.7 4	(0+ to 4+)	A	$J\pi$: γ to (2)+.
1554.6@ 6	(14-)	C	$J\pi$: $\Delta J=(2)$ γ to (12-); γ to (13-).
1714.5# 6	(15+)	C	
1730.0§ 5	(15+)	C	
1986.2# 6	(16+)	C	
1995.3@ 6	(15-)	C	
2159.1@ 7	(16-)	C	
2237.8§ 6	(17+)	C	
2267.1# 7	(17+)	C	
2559.7# 6	(18+)	C	
2782.0§ 7	(19+)	C	
2823.3@ 8	(18-)	C	
2860.1# 7	(19+)	C	
3172.4# 7	(20+)	C	
3388.5§ 7	(21+)	C	
3492.1# 8	(21+)	C	
3520.4@ 8	(20-)	C	
3869.4# 8	(22+)	C	

† For high-spin ($J>5$) states, the assignments are based on tentative multipolarity assignments, band associations and systematics of neighboring nuclei. Ascending spins are assumed as the excitation energy rises.

‡ From $\gamma\gamma(t)$ in ($^{14}\text{N}, 4n\gamma$) (1990Kr06) for excited states.

§ (A): $v1/2[521] \otimes \pi 1/2[541]$. $K\pi=1+$ and $0+$, Coriolis-mixed, doubly-decoupled band (1990Kr06). Configuration is mixed with $K=1$ and 2 members of configuration= $\pi 3/2[532] \otimes v1/2[521]$.

(B): $\pi 1/2[541] \otimes v7/2[514]$. $K\pi=3+$ and $4+$, Coriolis-mixed. Configuration is mixed with $K=2$ and 5 members of configuration= $\pi 3/2[532] \otimes v7/2[514]$. 1990Kr06 propose $\pi 5/2[402]v_{13/2}$ or $\pi h_{9/2}v7/2[514]$.

@ (C): $\pi h_{9/2} \otimes v_{13/2}$. Semi-decoupled band (1990Kr06). Spins are decreased by one unit from those proposed by 1990Kr06 following the assignment of 4- for 152.4 level.

Adopted Levels, Gammas (continued)

$\gamma(^{182}\text{Ir})$							Comments
E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	Mult. [‡]	$\delta^{\ddagger}$	$\alpha^{\textcircled{a}}$	I(γ +ce)	
8.1?	(8.1§)						
25.89	25.7 3		E2		2830 180	100	
71.02	45.3 3	100 15	M1+E2	0.10 3	12.5 12		
	71.1 3	=4	[E2]		19.4 5		
74.82	74.8 2	100	M1+E2	0.27 5	3.4 4		
87.38	(12.6)		[M1]		115.3		
	87.4 2	100	E2		8.10 14		
88.8	17.8 3		M1		173 10	100	
95.07	69.3 3	100 19	M1+E2	=0.2	=3.85		
	95.1 3	36 6	M1(+E2)	<1.1	6.7 4		
109.9	39.0 3	100	(M1)		16.9 5		
152.23	64.9 3	=4	[E1]		0.251 5		
	77.4 2	100 15	E1		0.748		
152.44	57.3# 2	15.7 24	E1		0.353 6		
	81.5 2	100 16	E1		0.666 11		
	152.5 3	10.3 16	[E1]		0.1357 21		
171.4	145.4 3	100	(E2)		1.071 18		
174.48	22.0 3	100	M1		92 4		
176.4	105.4 3	100	(E1)		0.349 6		B(E1)(W.u.)=1.0×10 ⁻⁶ 4.
185.8	75.7 3	100					
190.37	101.6 3	100	M1(+E2)	<0.5	5.70 18		
194.36	106.9 3	100 16	M1(+E2)	<0.5	4.90 18		
	119.6 3	25 4	M1, E2		3.0 7		
199.8	47.6 3	100	M1		9.41 22		
210.97	58.7 2	20 3	E1		0.330 6		
	123.6 2	13.0 13	M1(+E2)	<0.3	3.28 8		
	136.2 2	100 12	M1(+E2)	<0.5	2.42 13		
231.6	55.2 3	100 15	(M1)		6.09 13		
	79.2 3	61	(E2)		12.4 3		
255.1	44.1 3	100	M1		11.8 3		
259.60	172.3 3	13.9 20	[M1, E2]		0.94 37		
	184.9 3	100 14	M1(+E2)	<1.5	0.86 22		
266.6	35.0 3	100	(M1)		23.3 7		
283.80	196.6 3	75 11	[E2]		0.366		
	283.9 3	100 17	M1(+E2)	<0.7	0.29 4		
292.2	106.5 3	=100					
	182.5 3	=82					
320.93	110.1 3	5.3 8	E1		0.312		
	146.4 2	100 15	M1		2.06		
	168.8 3	4.2 7	M1		1.380		
341.66	246.8 3	83 13	[M1, E2]		0.33 16		
	266.7 3	100 13	M1, E2		0.26 13		
345.67	24.8 3		M1+E2	0.05 3	73 14	338 85	
	171.2 2	100 15	M1(+E2)	<0.5	1.25 8		
346.7	80.2 3	100					
377.06	186.7 3	100	M1(+E2)	<0.7	0.94 10		
382.16	229.8 3	27 8	E1		0.0483		
	287.2 3	94 12	M1(+E2)	<0.6	0.29 3		
	307.2 3	100 18	M1(+E2)	<0.7	0.23 3		
	374.1§ 3	36 5					
	382.1 3	18 6	M1+E2	1.4 5	0.081 22		
426.0	133.6 3	29 4					
	240.3 3	100 11					
	254.8 3	89 11	(Q)				
439.4	147.7 3	9 2					
	253.1 3	50 6	(Q)				
	267.8 3	100 28	(Q)				
452.50	70.3 3	100 22	M1		3.00 6		
	110.9 3	10.9 17	M1(+E2)	<1	4.2 4		
	262.3 3	65 9	M1(+E2)	<1.7	0.308 98		
	278.1 3	52 9	E1		0.0303		
458.30	458.4 3	100 22	M1(+E2)	<0.6	0.082 9		
519.8	173.1 3	100 6	(M1+E2)		0.93 36		

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ir})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	Mult. [‡]	$\delta^{\ddagger}$	$\alpha^{\@}$
519.8	253.0 3	46 5	(Q)		
590.7	151.2 3	12 2			
	165.2 3	13 2	D		
	298.7 3	100 10			
615.21	157.0 3	43 6	[M1, E2]		1.25 45
	615.1 3	100 16	M1+E2	≈ 0.8	≈ 0.0312
632.4	112.6 3	36 4	(M1+E2)		3.6 8
	285.8 3	100 11			
636.87	184.8 3	20 3	M1(+E2)	< 1.2	0.89 19
	353.3 3	13 3	(M1)		0.181
	377.2 3	84 12	M1(+E2)	< 0.5	0.141 11
	549.3 3	16 3	[M1, E2]		0.038 19
	561.9 3	100 13	M1(+E2)	< 0.7	0.047 6
662.70	210.3 3	100 14	M1, E2		0.52 23
	403.1 3	71 14	M1(+E2)	< 0.7	0.113 15
	468.3 3	46 8	E2+M1	1.7 6	0.043 12
	588.0 3	≈ 50	M1		0.0471
776.3	185.7 3	14 3			
	350.1 3	100 12			
782.9	523.2 3	100	M1(+E2)	< 0.3	0.0621 20
807.0	367.3 3	100	(Q)		
852.8	593.6 3	79 12	M1(+E2)	< 0.5	0.043 3
	826.5 3	100 17	(E2)		0.00767
904.1	527.2 3	100 15	M1(+E2)	< 0.1	0.0624
	713.5 3	50 8			
907.5	275.2 3	100 11			
	387.7 3	46 4			
922.7	577.0 3	100	E1, E2		
985.3	209.0 3				
	394.8 3	100 12	(Q)		
1002.34	339.8 3	4.2 6	M1(+E2)	< 1.5	0.154 47
	365.6 3	11.7 17	M1(+E2)	< 0.6	0.150 15
	387 1	3.9 6	[M1, E2]		0.094 48
	549.6 3	9.4 17	M1(+E2)	< 0.1	0.0560
	620.2 3	4.3 7			
	625.1 3	8.3 11	M1(+E2)	< 1.6	0.0308 95
	656.6 3	55 6	E1		0.00453
	681.4 3	100 10	E1		0.00421
	718.6 3	3.7 6	M1(+E2)	< 0.6	0.0257 24
	742.7 3	2.4 4	M1(+E2)	< 2	0.0193 65
	791.4 3	17.2 22	M1		0.0219
	808.0 3	2.6 4	(M1)		0.0208
	812.2 3	3.7 6			
	914.9 3	6.1 11			
1024.85	241.9 3	14.3 22	M1(+E2)	< 0.5	0.47 4
	362.2 3	41 5	M1(+E2)	< 0.7	0.150 19
	388.1 3	27 5	M1(+E2)	< 0.8	0.122 19
	572.3 3	100 11	M1		0.0505
	642.7 3	22 3			
	647.8 3	35 5	M1(+E2)	< 0.9	0.031 6
	679.3 3	62 8			
	703.9 3	62 8	E1		0.00395
	834.3 3	21 3			
1039.0	131.5 3	7 1			
	406.5 3	100 13	(Q)		
1135.66	790.0 3	≈ 67	E1		0.00316
	814.8 3	100 12	E1		0.00297
	924.6 3	12.9 20	M1(+E2)	< 0.6	0.0136 12
1212.1	435.8 3	100			
1248.3	441.1 3	100			
1408.6	369.5 3	96 12			
	501.2 3	100 19			
1456.8	207.8 3				

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Ir})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$	Mult. [‡]	E(level)	$E\gamma^{\dagger}$	$I\gamma^{\dagger}$
1456.8	471.7 3	100 6		2237.8	507.8 3	100
1540.7	1281.1 3	100		2267.1	552.6 3	100
1554.6	145.9& 3	6 1		2559.7	573.5 3	100
	515.6 3	100 9	(Q)	2782.0	544.2 3	100
1714.5	502.4 3	100		2823.3	664.2 3	100
1730.0	272.8 3			2860.1	593.0 3	100
	482.2 3	100 12		3172.4	612.7 3	100
1986.2	529.4 3	100		3388.5	606.5 3	100
1995.3	440.8 3	100 13		3492.1	632.0 3	100
	586.7 3			3520.4	697.1 3	100
2159.1	163.5& 3			3869.4	697.0 3	100
	604.5 3	100 10				

[†] From ce data in ^{182}Pt ϵ decay for transitions from low-spin ($J < 6$) states and from $\gamma(0)$ in ($^{14}\text{N}, 4n\gamma$) for high-spin ($J > 5$) states.

[‡] From ce data in ^{182}Pt ϵ decay for transitions from low-spin ($J < 6$) states and from $\gamma(0)$ in ($^{14}\text{N}, 4n\gamma$) for high-spin ($J > 5$) states.

In ($^{14}\text{N}, 4n\gamma$), E2 is assumed for $\Delta J = 2$ transitions and M1 for $\Delta J = 1$, $\Delta\pi = \text{no}$ and E1 for $\Delta J = 1$, $\Delta\pi = \text{yes}$. Data supporting assignments in for high-spins are available only for a few transitions. For some others, intensity balance arguments are used.

§ Ordering of 373.6–8.1 and 17.6–101.5 cascades is not established.

From ^{182}Pt ϵ decay only.

@ Theoretical values from BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" approximation. If no value of $\delta(\text{E2/M1})$ given it was as 1.00.

& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)(A) $\nu 1/2[521] \otimes \pi 1/2[541]$.(B) $\pi 1/2[541] \otimes \nu 7/2[514]$.(C) $\pi h_{9/2} \otimes \nu i_{13/2}$.

Adopted Levels, Gammas

$Q(\beta^-) = -7867.25$; $S(n) = 9865.20$; $S(p) = 3986.29$; $Q(\alpha) = 4951.5$ 2012Wa38.

$Q(\epsilon p) = 93.29$, $S(2n) = 17875.17$, $S(2p) = 6384.21$ (2012Wa38).

Hyperfine structure measurements: 1999Ro28 (also 2000Le40, 1999Sa40).

Mass measurement: 2000Ra23 (Schottky mass spectrometry).

Structure calculations: 2015Bu05, 2014Ga08, 2013Ra33, 2012Bh11, 2011Ga35, 2011No01, 2010Sh24, 2010Ro06, 2009Ga15, 2008Mo14, 2008Sa21, 2006Pa39, 2005Mc08, 2005Mc09, 2001Th11, 1999Da18, 1997Es01, 1989Ch23, 1988Ch40, 1987Be06, 1987Hs01, 1987Ve06, 1986Dr05, 1981Sa31, 1973Zi03.

First identification of ^{182}Pt isotope by 1963Gr08.

 ^{182}Pt Levels

Average g factor: $\langle g \rangle = +0.365$, for 6+ to 12+ states in the high-spin quasi-continuum (2002Ro12, 2002Ro36, 2014StZZ).

Cross Reference (XREF) Flags

A ^{182}Au ϵ Decay (15.5 s)
 B ^{183}Hg ϵp Decay (9.4 s)
 C ^{186}Hg α Decay (1.38 min)
 D $^{170}\text{Yb}(^{16}\text{O}, 4n\gamma)$

E(level) [†]	$J\pi^{\ddagger}$	XREF	$T_{1/2}^{\S}$	Comments
0.0 [#]	0+	ABCD	2.67 min 12	$\% \epsilon + \% \beta^+ = 99.962\ 2$; $\% \alpha = 0.038\ 2$. $\langle r^2 \rangle^{1/2}(\text{rms charge radius}) = 5.3969\ \text{fm}\ 41$ (2013An02, evaluation). $\delta \langle r^2 \rangle^{2(194\text{Pt}-182\text{Pt})} = -0.279\ \text{fm}^2\ 10$ (1999Ro28). $\% \alpha$: from 1995Bi01. Others: 0.023 (1963Gr08, 1966Si08). $T_{1/2}$: weighted average of 2.6 min 1 (γ timing, 1972Fi12), 3.0 min 2 (α timing, 1966Si08) and 2.5 min 5 (1963Gr08).
154.97 [#] 9	2+	A D	479 ps 30	$\mu = +0.46\ 8$ (2002Ro36, 2014StZZ). μ : perturbed $\gamma\gamma(\theta)$ from oriented nuclei (PDCO method) in high-spin reactions (2002Ro36, 2002Ro12).
419.62 [#] 12	4+	A D	32.5 ps 20	$J\pi$: E2 γ to 0+. $\mu = +1.7\ 8$ (2002Ro36, 2014StZZ). μ : perturbed $\gamma\gamma(\theta)$ from oriented nuclei (PDCO method) in high-spin reactions (2002Ro36, 2002Ro12).
499.70 [@] 14	0+	A D		$J\pi$: $\Delta J=2$, E2 γ to 2+.
667.77 ^{&} 12	2+	A D		$J\pi$: E0 transition to 0+.
774.85 [#] 17	6+	A D	5.28 ps 35	$J\pi$: E2 γ to 0+; E0+E2(+M1) γ to 2+.
856.26 [@] 11	2+	A D		$J\pi$: $\Delta J=2$, E2 γ to 4+.
942.70 ^{&} 17	(3+)	A D		$J\pi$: E2 γ to 0+.
1034.04 ^{&} 14	(4+)	A D		$J\pi$: (E2+M1) γ to 2+; γ to 4+; probable band assignment.
1152.07 22	(0+)	A		$J\pi$: M1+E2 γ to 4+; γ to 2+; probable band assignment.
1182.06 14	(2+)	A		$J\pi$: (0) from $\gamma\gamma(\theta)$, although other spins cannot be ruled out; (E2) γ to 2+.
1205.76 [#] 19	8+	D	2.26 ps 21	$J\pi$: (E0+M1+E2) γ to 2+.
1239.92 [@] 13	4+	A D		$J\pi$: $\Delta J=2$, E2 to 6+.
1305.80 ^{&} 19	(5+)	A D		$J\pi$: E2 γ to 6+; E0+E2(+M1) γ to 4+.
1311.71 17	2+	A		$J\pi$: γ s to 6+ and 4+; probable band assignment.
1419.60 18	(4+)	A		$J\pi$: E0 γ to 2+.
1437.6 ^{&} 5	(6+)	D		$J\pi$: (E2) γ to 2+; possible γ to 6+.
1473.85 18		A		$J\pi$: γ s to 4+ and 6+; probable band assignment.
1502.47 24		A		$J\pi$: γ s to (4+) and 2+.
1521.82 23		A		$J\pi$: γ to 2+.
1542.55 17	(2+, 3, 4+)	A		$J\pi$: γ to 4+.
1568.92 23		A		$J\pi$: γ s to 4+ and 2+.
1649.5 [@] 5	6+	D		$J\pi$: γ to 4+.
1670.7 ^e 5	(5-)	D		$J\pi$: $\Delta J=(2)\ \gamma$ to 4+; γ to 6+; band assignment.
1684.53 23		A		$J\pi$: $\Delta J=(1)\ \gamma$ to 4+; possible bandhead.
1698.36 [#] 22	10+	D	1.09 ps 14	$J\pi$: γ to 4+.
1730.6 ^{&} 6	(7+)	D		$J\pi$: $\Delta J=2\ \gamma$ to 8+; band assignment.
1845.5 ^f 8	(6-)	D		$J\pi$: γ s to (5+), 6+ and 8+; probable band assignment.
1864.1 5	(6+)	D		$J\pi$: $\Delta J=(1)\ \gamma$ to (5+).
1889.23 23		A		$J\pi$: $\Delta J=(2)\ \gamma$ to (4+); $\Delta J=(1)\ \gamma$ to (5+); γ to 6+.
1924.7 ^e 5	(7-)	D		$J\pi$: γ to 4+.
1955.6 ^c 5	(7-)	D		
2082.6 ^b 10	(8-)	D		$J\pi$: $\Delta J=1\ \gamma$ to 8+; $\Delta J=2\ \gamma$ to (5-); γ to 6+.
2117.5 [@] 12	8+	D		$J\pi$: $\Delta J=1$, (M1+E2) γ to (7-); band assignment.
				$J\pi$: γ to 6+; band assignment.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{182}Pt Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF	T _{1/2} [§]	Comments
2149.9 ^f 7	(8-)	D		
2241.2 ^e 7	(9-)	D		J π : $\Delta J=2$ γ to (7-).
2241.9 ^c 10	(9-)	D		J π : $\Delta J=1$, (M1+E2) γ to (8-); band assignment.
2242.0 [#] 7	12+	D	1.18 ps 7	J π : $\Delta J=2$ γ to 10+; band assignment.
2427.7 ^b 11	(10-)	D		J π : $\Delta J=1$, (M1+E2) γ to (9-); band assignment.
2504.1 ^f 8	(10-)	D		
2615.4 ^e 7	(11-)	D		J π : $\Delta J=2$ γ to (9-).
2635.2 ^c 12	(11-)	D		J π : $\Delta J=1$, (M1+E2) γ to (10-); band assignment.
2690.2 ^a 8	(12+)	D		
2832.0 [#] 7	14+	D	1.11 ps 14	J π : $\Delta J=(2)$ γ to 12+; band assignment.
2860.4 ^b 13	(12-)	D		J π : $\Delta J=1$, (M1+E2) γ to (11-); band assignment.
2931.8 ^f 9	(12-)	D		
3046.9 ^e 9	(13-)	D		
3096.5 ^d 8	(13-)	D		J π : γ s to 12+ and 14+.
3103.5 ^c 13	(13-)	D		J π : $\Delta J=2$ γ to (11-); $\Delta J=1$ γ to (12-).
3168.4 ^a 9	(14+)	D		
3289.6 10	(12, 13, 14+)	D		J π : γ to 12+.
3357.9 ^b 14	(14-)	D		J π : $\Delta J=(2)$ γ to (12-).
3425.4 ^f 11	(14-)	D		
3460.5 [#] 8	16+	D	<2.57 ps	J π : $\Delta J=2$ γ to 14+; band assignment. T _{1/2} : effective half-life; side feeding correction could not be applied.
3480.0 ^d 9	(15-)	D		J π : $\Delta J=(1)$ γ to 14+.
3542.6 ^e 10	(15-)	D		J π : $\Delta J=2$ γ to (13-).
3629.4 ^c 14	(15-)	D		J π : $\Delta J=2$ γ to (13-).
3645.2 ^a 9	(16+)	D		
3906.3 ^b 15	(16-)	D		J π : $\Delta J=2$ γ to (14-); $\Delta J=1$ γ to (15-).
3971.2 ^f 11	(16-)	D		J π : $\Delta J=2$ γ to (14-).
3982.4 ^d 10	(17-)	D		J π : $\Delta J=(2)$ γ to (15-).
4078.1 ^e 13	(17-)	D		J π : $\Delta J=(2)$ γ to (15-).
4094.3 [#] 8	18+	D		J π : $\Delta J=2$ γ to 16+; band assignment.
4203.6 ^c 15	(17-)	D		J π : $\Delta J=(2)$ γ to (15-).
4232.0 ^a 9	(18+)	D		
4500.5 ^b 16	(18-)	D		J π : $\Delta J=(2)$ γ to (16-).
4555.4 ^f 13	(18-)	D		
4569.6 ^d 11	(19-)	D		J π : $\Delta J=2$ γ to (17-).
4657.0 ^e 15	(19-)	D		J π : $\Delta J=(2)$ γ to (17-).
4728.5 [#] 11	20+	D		J π : $\Delta J=(2)$ γ to 18+; band assignment.
4825.2 ^c 17	(19-)	D		J π : $\Delta J=(2)$ γ to (17-).
4919.1 ^a 10	(20+)	D		
5139.7 ^b 18	(20-)	D		J π : $\Delta J=2$ γ to (18-).
5167.2 ^f 15	(20-)	D		
5207.9 ^d 15	(21-)	D		J π : $\Delta J=2$ γ to (19-).
5278.5 ^e 18	(21-)	D		J π : $\Delta J=(2)$ γ to (19-).
5403.2 [#] 15	22+	D		J π : $\Delta J=(2)$ γ to 20+; band assignment.
5494.4 ^c 20	(21-)	D		
5637.7 ^a 14	(22+)	D		
5775.7 ^b 20	(22-)	D		
5804.6 ^f 18	(22-)	D		
5893.9 ^d 18	(23-)	D		
5951.5 ^e 21	(23-)	D		J π : $\Delta J=(2)$ γ to (21-).
6126.8 [#] 18	24+	D		J π : $\Delta J=(2)$ γ to 22+; band assignment.
6208.4 ^c 22	(23-)	D		J π : $\Delta J=(2)$ γ to (21-).
6380.7 ^a 18	(24+)	D		
6399.7 ^b 23	(24-)	D		
6479.6 ^f 21	(24-)	D		
6624.9 ^d 20	(25-)	D		
6904.8 [#] 21	26+	D		
6961.4 ^c 24	(25-)	D		
7396.9 ^d 23	(27-)	D		

[†] From least-squares fit to E γ data, normalized $\chi^2=0.7$.

Adopted Levels, Gammas (continued)

¹⁸²Pt Levels (continued)

‡ For high-spin (J>10) levels, the assignments are generally based on yrast pattern of population of levels in heavy-ion fusion reactions, $\gamma(\theta)$ data for selected transitions and band associations. Ascending spins with excitation energies are expected (and assumed here) in such reactions. When appropriate, separate arguments are also given. Stretched quadrupole ($\Delta J=2$) transitions are generally assumed as E2.

§ From recoil-distance Doppler-shift method (2012Wa16,2012Gl01) for excited states.

(A): $K\pi=0+, g.s.$ band. Measured average $g=+0.36$ for 6+ to 12+ states in the ground band (2002Ro12,2002Ro36) using perturbed $\gamma(\theta)$ from oriented nuclei (PDCO method) in high-spin reactions.

@ (B): $K\pi=0+, oblate$ band.

& (C): $K\pi=2+, \gamma$ band.

a (D): Band based on (12+), $\alpha=0$. Continuation of g.s. band.

b (E): $\nu_{13/2} \otimes \nu_{h_{9/2}}, \alpha=0$.

c (F): $\nu_{13/2} \otimes \nu_{h_{9/2}}, \alpha=1$.

d (G): $\pi_{13/2} \otimes \pi_{h_{9/2}}, \alpha=1$. No evidence for a signature partner of this structure.

e (H): $\nu_{13/2} \otimes \nu_{p_{3/2}}, \alpha=1$.

f (I): $\nu_{13/2} \otimes \nu_{p_{3/2}}, \alpha=0$.

$\gamma(^{182}\text{Pt})$

Theoretical B(E2) ratios for transitions from the second and third 2+ and first 3+ states are calculated by 2009Ga15 using IBA model with and without intruder states.

E(level)	$E\gamma^\dagger$	$I\gamma^\ddagger$	Mult.‡	$\delta^\ddagger$	α	I($\gamma+ce$)	Comments
154.97	155.0 1	100	E2		0.885		B(E2)(W.u.)=114 8.
419.62	264.4 2	100	E2		0.1446		B(E2)(W.u.)=192 12.
499.70	344.8 2	100 5	E2		0.0658		
	499.3 4		E0			31 7	$q_K^2(E0/E2)=4.6$ 10, $X(E0/E2)=0.014$ 3 (2005Ki02 evaluation).
667.77	513.0 2	100 11	E0+E2(+M1)		0.048 25		Mult.: E0 component is expected to be small as indicated by $\alpha(K)_{exp}=0.044$ 6 (1999Da18).
	667.8 2	34 4	E2		0.01266		
774.85	355.1 2	100	E2		0.0603		B(E2)(W.u.)=292 20.
856.26	356.5 2	17 5	[E2]		0.0599		
	436.5 2	22.7 20	E2		0.0348		
	701.2 2	8.7 20	E0+E2(+M1)	0.7 +10-3	0.86 25		Total conversion coefficient from $\alpha(K)_{exp}=0.72$ 21 (1974Ca28), multiplied by a factor of 1.2 to account for other shells.
	856.2 2	100 3	E2		0.00748		
942.70	274.8 § 3	<15	[M1, E2]		0.26 13		
	523.1 2	18.2 22	[M1, E2]		0.046 24		
	787.7 2	100 14	(E2+M1)	>5	0.0092 4		
1034.04	366.1 2	50 25	[E2]		0.0556		
	614.5 2	100 6	M1+E2	1.4 5	0.025 7		
	879.1 2	10 4					
1152.07	997.1 2	100	(E2)		0.00551		
1182.06	326.0 2	39 8	[M1, E2]		0.16 9		
	682.3 2	6.1 15					
	762.3 2	6.1 15					
	1027.1 2	100 11	(E0+M1+E2)	>2.7	0.0102 19		Total conversion coefficient from $\alpha(K)_{exp}=0.0085$ 16 (1999Da18), multiplied by a factor of 1.2 to account for other shells.
1205.76	430.9 1	100	E2		0.0360		B(E2)(W.u.)=266 25.
1239.92	383.0 2	66 12	[E2]		0.0492		E γ : poor fit, level-energy difference=383.7.
	465.0 2	24 7	E2		0.0296		
	572.5 2	41 12					
	820.5 2	34 5	E0+E2(+M1)		0.20 7		Total conversion coefficient from $\alpha(K)_{exp}=0.17$ 6 (1999Da18), multiplied by a factor of 1.2 to account for other shells.
	1085.2 2	100 7	(E2)		0.00466		
1305.80	271 § 1						E γ : from ¹⁷⁰ Yb(¹⁶ O,4n γ) only.
	363.1 § 2	=45	[E2]		0.0569		

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Pt})$ (continued)

E(level)	$E\gamma^{\dagger}$	$I\gamma^{\ddagger}$	Mult. ‡	$\delta^{\ddagger}$	α	I(γ +ce)	Comments
1305.80	531.0 2	45 36					
	886.3 2	100 27					
1311.71	455.6 4		E0			40 8	
	812.1 2	100 24					
	1156.6 2	52 8					
	1310.8 $\S$ 4	48 8					
1419.60	386.0 $\S$ 2	$\approx$ 59	[M1, E2]		0.10 6		
	644.1 $\S$ 2	$\approx$ 12					
	751.9 2	100 29	(E2)		0.00980		
	999.9 2	53 18					
1437.6	133 1						
	404 1						
	662 1						
	1017 1						
1473.85	439.7 2	93 13					
	617.7 2	100 53					
1502.47	834.7 2	100					
1521.82	1102.2 2	100					
1542.55	1122.9 2	88 33					
	1387.6 2	100 33					
1568.92	1149.3 2	100					
1649.5	410 1						
	875 1						
	1229 1	100 11	(Q)				
1670.7	432 1						
	636 $\S$ 1						
	896 1						
	1250 1	100 13	(D)				
1684.53	1264.9 2	100					
1698.36	492.6 1	100	E2		0.0257		B(E2)(W.u.)=280 40.
1730.6	427 1						
	523 1						
	955 1	100 17					
1845.5	540 1	100	(D)				
1864.1	559 1	46 15	(D)				
	831 1	58 10	(Q)				
	1089 1	100 12					
	1443 1	56 15					
1889.23	1469.6 2	100					
1924.7	254.1 10	100 13					
	275 1	72 6					
	487 1						
	719 1	60 9					
	1149 1						
1955.6	91.5 10	50 18					
	285 1	100 11	Q				
	306.0 10	87 16					
	518 1						
	750 1	58 11	D				
2082.6	127.0 10	100	(M1+E2)	+0.25 15	3.28 15		
2117.5	468 1						
2149.9	225 1						
	304.7 10	100 11					
	419 1						
2241.2	316.1 10	100 6	Q				
	1036 1						
2241.9	159.3 10	43 4	(M1+E2)	-0.21 7	1.73 5		
	286.3 10	100 9	(Q)				
2242.0	543.5 10	100	E2		0.0203		B(E2)(W.u.)=162 10.
2427.7	185.8 10	36 3	(M1+E2)	-0.21 6	1.12 3		
	345.1 10	100 6	Q				
2504.1	263 1						
	353.9 10	100 35					

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Pt})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. ‡	$\delta^{\ddagger}$	α	Comments
2615.4	374.2 1	100	Q			
2635.2	207.4 10	32 3	(M1+E2)	-0.18 7	0.827 22	
	393.2 10	100 6	(Q)			
2690.2	448 1					
	992 1					
2832.0	590.0 1	100	E2		0.0167	B(E2)(W.u.)=114 15.
2860.4	225.2 10	100 10	(M1+E2)	-0.29 15	0.64 4	
	432.7 10					
2931.8	317 1					
	427.4 10	100 18				
3046.9	431.2 10					
3096.5	264 1					
	407 1					
	854.4 10	100 14				
3103.5	243.1 10	18 2	D(+Q)	-0.02 5		
	468.4 10	100 9	Q			
3168.4	336.2 10					
	478 1					
3289.6	599 1					
	1048 1					
3357.9	254.4 10	21 4				
	497.5 10	100 6	(Q)			
3425.4	493.8 10	100				
3460.5	628.5 1	100	E2		0.01449	B(E2)(W.u.)>36.
3480.0	383.4 10	79 11				
	433 1					
	648.3 10	100 15	(D)			
3542.6	446 1					
	495.6 10	100 19	Q			
3629.4	271.5 10	20 6				
	525.9 1	100 9	Q			
3645.2	186 1					
	476.4 10					
	812.6 10					
3906.3	276.9 10	23 2	D(+Q)	-0.04 8		
	548.4 10	100 9	Q			
3971.2	428 1					
	546.0 10	100 14	Q			
3982.4	502.4 10	100 10	(Q)			
	522 1					
4078.1	535.9 10	100	(Q)			
4094.3	633.8 1	100	Q			
4203.6	297.3 10	28 8				
	574.2 10	100 9	(Q)			
4232.0	138 1					
	587.0 10					
	771.1 10					
4500.5	296.9 10	45 13				
	594.2 10	100 9	(Q)			
4555.4	477 1					
	583.7 10	100 14				
4569.6	587.2 1	100	Q			
4657.0	579.7 10	100	(Q)			
4728.5	634.6 10	100	(Q)			
4825.2	324.7 10					
	621.6 10	100 13	(Q)			
4919.1	191 1					
	687.0 10					
	824.6 10					
5139.7	314.5 10					
	639.2 10	100	Q			
5167.2	511 1					
	611.1 10	100				

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Pt})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. §	E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger}$	Mult. §
5207.9	638.3 10	100	Q	6126.8	723.6 10	100	(Q)
5278.5	621.5 10	100	(Q)	6208.4	714 1	100	(Q)
5403.2	674.7 10	100	(Q)	6380.7	743 1		
5494.4	669.2 10	100		6399.7	624 1		
5637.7	718.6 10			6479.6	675 1		
5775.7	636 1			6624.9	731 1		
5804.6	637.4 10			6904.8	778.0 10	100	
5893.9	686 1			6961.4	753 1		
5951.5	673 1	100	(Q)	7396.9	772 1		

† For transitions from levels up to 1034 keV, weighted averages of values from ^{182}Au ϵ decay and $^{170}\text{Yb}(^{16}\text{O},4n\gamma)$ are taken.

Above this excitation energy, there are no levels common between the two studies.

‡ From ^{182}Au ϵ decay for transitions from low-spin ($J < 7$), for higher spin levels, values or assignments are from $(^{16}\text{O},4n\gamma)$.

§ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)(E) $\nu i_{13/2} \otimes \nu h_{9/2}, \alpha=0.$ (F) $\nu i_{13/2} \otimes \nu h_{9/2}, \alpha=1.$ (G) $\pi i_{13/2} \otimes \pi h_{9/2}, \alpha=1.$

Adopted Levels, Gammas (continued)

 (H) $\nu_{i_{13/2} \otimes \nu_{p_{3/2}}, \alpha=1}$.

 (I) $\nu_{i_{13/2} \otimes \nu_{p_{3/2}}, \alpha=0}$.

 $^{182}_{78}\text{Pt}_{104}$

Adopted Levels, Gammas

$Q(\beta^-) = -4724$ 23; $S(n) = 8501$ 28; $S(p) = 1215$ 25; $Q(\alpha) = 5526$ 4 2012Wa38.

$S(2n) = 18849$ 28, $S(2p) = 4901$ 30, $Q(\epsilon p) = 180$ 24 (2012Wa38).

First identification of ^{182}Au isotope by 1970Ha18.

 ^{182}Au Levels

Cross Reference (XREF) Flags

A ^{182}Hg ϵ Decay (10.83 s)

B ^{186}Tl α Decay (27.5 s)

C $^{152}\text{Sm}(^{35}\text{Cl}, 5n\gamma)$

E(level)	$J\pi^\dagger$	XREF	$T_{1/2}$	Comments
0.0	(2+)	ABC	15.5 s 4	$\% \epsilon + \% \beta^+ = 99.87$ 5; $\% \alpha = 0.13$ 5. $\mu = 1.30$ 10 (1992DeZO, 1992Ro21, 2014StZZ). $\% \alpha$: from 1995Bi01. Others: 0.038 8 (1979Ha10), ≈ 0.04 (1970Ha18). $T_{1/2}$: from weighted average of 15.6 s 4 (1992Ro21), 15.3 s 10 (1995Bi01, γ timing) and 14.5 s 13 (1995Bi01, α timing). Others: 20 s 2 (1979Ha10), 22.1 s 13 (1972Fi12), 19 s 2 (1970Ha18). $J\pi$: M1 γ from (1+) gives (0+, 1+, 2+); 2, 3, 4 from g factor measurements of ^{182}Au g.s. by nuclear orientation method (1992DeZO, 1992Ro21, experiment using NICOLE system at ISOLDE-CERN). μ: 1992DeZO (also 1992Ro21) measured g factors by nuclear orientation technique and by spin-relaxation method. For spin of 1, 2, 3, 4 and 5 values are: 0.85 6, 0.68 5, 0.53 5, 0.43 5, 0.35 5, respectively from nuclear orientation method and 0.73 5, 0.62 5, 0.55 5, 0.51 6, 0.46 3, respectively, from spin-relaxation method. From comparison of results from the two methods, 1992DeZO conclude that for spin of 2, 3 or 4 the values are in better agreement than with those from spin 1 and 5 choices. Value listed here is from average g factor = 0.65 5.
0+x §	(10-)	C		
0+y ^a	(6+)	C		
25.60 10	(≤ 3) (+)	A		$J\pi$: E1 γ from (1-, 2-); γ to (2+).
62.90 10	(1+, 2+)	A		$J\pi$: M1 γ from (1+); γ to (2+) probably M1.
98.97 10	(1+) $\frac{7}{2}$	A		
100.70 12	(0+, 1+, 2+)	A		$J\pi$: M1 γ from (1+).
104.3+y ^b 7	(7+)	C		
127.00 11	(1+, 2+)	A		$J\pi$: M1 γ from (1+); (M1) γ to (2+).
129.49 7	(1-, 2-)	A C	≤ 50 ns	$J\pi$: E1 γ from (1+); E1 γ to (2+). $T_{1/2}$: from $\gamma\gamma(t)$ or (ce)(γ)(t) in ^{182}Hg ϵ decay.
205.0+x [#] 4	(11-)	C		
231.4+y ^a 5	(8+)	C		
273.51 7	(1-, 2-)	A		$J\pi$: E1 γ from (1+); E1 γ to (2+).
308.97 14	(≤ 3) (-)	A		$J\pi$: E1 γ from (+) parity level.
320.0+x § 4	(12-)	C		
325.40 9	(0-, 1-, 2-)	A		$J\pi$: E1 γ from (1+).
339.30 10	(1+) $\frac{7}{2}$	A		
362.69 13	(1+) $\frac{7}{2}$	A		
384.4+y ^b 6	(9+)	C		
482.01 12	(0+, 1+, 2+)	A		$J\pi$: E1 $\rightarrow$ M1 + E2 $\rightarrow$ E1 cascade to g.s. (2+); γ from (1+).
543.00 7	(1+) $\frac{7}{2}$	A		
559.9+y ^a 6	(10+)	C		
575.5+x [#] 5	(13-)	C		
756.9+y ^b 7	(11+)	C		
763.5+x § 7	(14-)	C		
968.9+y ^a 7	(12+)	C		
1006.4+y [@] 7	(12+)	C		
1036.0+x [#] 7	(15-)	C		
1138.4+y ^{&} 8	(13+)	C		
1277.4+y [@] 8	(14+)	C		
1294.5+x § 9	(16-)	C		
1487.1+y ^{&} 8	(15+)	C		
1572.0+x [#] 9	(17-)	C		
1660.8+y [@] 9	(16+)	C		
1892.0+x § 10	(18-)	C		
1917.2+y ^{&} 9	(17+)	C		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)
¹⁸²Au Levels (continued)

E(level)	Jπ [†]	XREF	E(level)	Jπ [†]	XREF	E(level)	Jπ [†]	XREF
2126.3+y@ 9	(18+)	C	2657.1+y@ 10	(20+)	C	3549.6+y& 12	(23+)	C
2173.0+x# 10	(19-)	C	2836.0+x# 12	(21-)	C	3883.1+y@ 12	(24+)	C
2408.0+y& 10	(19+)	C	2949.6+y& 10	(21+)	C	4219.1+y& 13	(25+)	C
2559.5+x\$ 11	(20-)	C	3243.6+y@ 11	(22+)	C	4579.1+y@ 16	(26+)	C

[†] For high-spin states (J≥6), tentative assignments are from 2002Zh26 based on configurations of two bands from systematics. The 6+ and 7+ bandheads seem to be assigned from deexcitation of signature-partner bands based on $\pi_{13/2} \otimes \nu_{13/2}$. No supporting $\gamma\gamma(\theta)$ or $\gamma(\theta)$ are available.

[‡] Possible allowed β transition from 0+ (see ¹⁸²Au ϵ decay).

\$ (A): $\pi h_{9/2} \otimes \nu_{13/2}, \alpha=0$.

(B): $\pi h_{9/2} \otimes \nu_{13/2}, \alpha=1$.

@ (C): $\pi i_{13/2} \otimes \nu_{13/2}, \alpha=0$.

& (D): $\pi i_{13/2} \otimes \nu_{13/2}, \alpha=1$.

a (E): Band based on (6+), $\alpha=0$.

b (F): Band based on (7+), $\alpha=1$.

 $\gamma(^{182}\text{Au})$

E(level)	E $\gamma^{\dagger}$	I $\gamma^{\dagger}$	Mult. [‡]	α	Comments
25.60	25.6 1	100	[M1]	71.1 13	
62.90	62.9 1	100	[M1]	5.03	
98.97	98.9 2	100	[M1]	7.49	
100.70	37.8 1	100	[M1]	22.5	
104.3+y	104 1	100			
127.00	64.1 2	100 50	[M1]	4.76 8	
	127.0 3	38 19	(M1)	3.66	
129.49	30.5 1	3.7 7	(E1)	2.09 4	
	103.9 2	23 2	E1	0.377	
	129.5 1	100	E1	0.216	
205.0+x	205.0 5	100			
231.4+y	127 1	33			
	231.5 5	100			
273.51	144.0 2	43 6	M1	2.56	
	248.0 2	38.8 13	(E1)	0.0425	
	273.5 1	100.0 19	E1	0.0335	
308.97	179.5 2	46 3	M1+E2	1.0 5	
	182.0 2	100 7	E1	0.0912	
320.0+x	115.0 5	8			
	320.0 5	100			
325.40	51.9 1	78 4	M1	8.83	
	195.9 2	100 11	(M1)	1.077	Mult.: E0+M1 or abnormal M1; K/L=4.8.
339.30	212.3 2	66 6	M1	0.860	a(L)=0.16.
	240.4 3	15 2	[M1]	0.610	
	339.3 2	100.0 23	M1	0.238	
362.69	233.2 3	67 3	(E1)	0.0493	
	235.7 1	100 4	M1	0.644	
	362.7 3	72.0 17	M1	0.199	
384.4+y	153 1	100			
	280.0\$ 5	57			
482.01	173.1 2	100	E1	0.1035	
543.00	61.0 1	2.2 11	[M1]	5.50	
	180.3 3	1.1 3	[M1]	1.358	
	203.7 1	1.6 3	(M1)	0.965	
	217.6 1	100 8	E1	0.0585	
	269.5 1	13.2 5	E1	0.0347	
	413.5 1	84 8	E1	0.01293	
	442.3 2	11.4 3	M1	0.1169	
	480.0 3	16.0 8	M1	0.0942	
	543.0 2	10.3 6	M1	0.0681	
559.9+y	175.5 5	22			
	328.5 5	100			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Au})$ (continued)

E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	E(level)	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$
575.5+x	255.5 5	86	1277.4+y	308.5 5	38	2408.0+y	491 1	100
	370.5 5	100	1294.5+x	531.0 5	100	2559.5+x	667.5 5	100
756.9+y	197 1	75	1487.1+y	209.5 5	100	2657.1+y	249.0 5	22
	372.5 § 5	100		349 1	89		531.0 5	100
763.5+x	443.5 5	100	1572.0+x	536.0 5	100	2836.0+x	663.0 5	100
968.9+y	409.0 5	100	1660.8+y	173.5 5	46	2949.6+y	292.5 5	29
1006.4+y	249.5 5	14		383.5 5	100		541.5 5	100
	446.5 5	100	1892.0+x	597.5 5	100	3243.6+y	294.0 5	57
1036.0+x	273 1	45	1917.2+y	256.5 5	75		586.5 5	100
	460.5 5	100		430.2 5	100	3549.6+y	600.0 5	100
1138.4+y	132.0 5	43	2126.3+y	209.0 5	29	3883.1+y	639.5 5	100
	169.5 5	100		465.5 5	100	4219.1+y	669.5 5	100
1277.4+y	139.0 5	75	2173.0+x	601.0 5	100	4579.1+y	696 § 1	100
	271.0 5	100	2408.0+y	281.5 5	43			

[†] From ^{182}Hg ϵ decay for transitions from low-spin ($J < 4$) states, from ($^{35}\text{Cl}, 5n\gamma$) for transitions from high-spin states.

[‡] From ce data in ^{182}Hg ϵ decay.

§ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)

(E) Band based on (6+),
 $\alpha=0$

(F) Band based on (7+),
 $\alpha=1$

Adopted Levels, Gammas

$Q(\beta^-) = -10270$ 60; $S(n) = 10987$ 18; $S(p) = 2994$ 22; $Q(\alpha) = 5996$ 5 2012Wa38.

$S(n) = 19469$ 16, $S(2p) = 3719$ 15, $Q(\epsilon p) = 3509$ 18 (2012Wa38).

Isotope shift, RMS radii: 1986U102.

Mass measurements and analysis: 2001Sc41, 2001Sc54, 2002No01.

Analyzed band structures: 1994Dr04, 1989Ha13.

Nuclear structure calculations and analyses (levels, band structures, deformation, etc.): 2014Ga02, 2014Ga04, 2013No05, 2013Ya05, 2011Ga35, 2003Sa27, 1999Sh04, 1997Jo21, 1997Yo04, 1996Wa13, 1996Bi06, 1996He02, 1996Wo02, 1994Pa29, 1994Yo05, 1994Dr04, 1993Na05, 1991Tr01, 1987Be06, 1984Ba69, 1983Ba21, 1982Gi10, 1975Fr08, 1973Di12, 1972Fa11.

First identification of ^{182}Hg by 1968De01.

 ^{182}Hg Levels

Cross Reference (XREF) Flags

A ^{182}Tl ϵ Decay (3.1 s)
 B ^{186}Pb α Decay (4.82 s)
 C $^{96}\text{Mo}(^{88}\text{Sr}, 2n\gamma)$
 D $^{154}\text{Gd}(^{32}\text{S}, 4n\gamma)$
 E Coulomb Excitation

E(level) [†]	$J\pi^{\ddagger}$	XREF	$T_{1/2}^{\S}$	Comments
0.0 [#]	0+	ABCDE	10.83 s 6	$\% \epsilon + \% \beta^+ = 86.2$ 9; $\% \alpha = 13.8$ 9. $\langle r^2 \rangle^{1/2}(\text{rms charge radius}) = 5.3833$ fm 52 (2013An02, evaluation). $\delta \langle r^2 \rangle (^{198}\text{Hg} - ^{182}\text{Hg}) = -0.6384$ fm² 20 (1986U102). Based on deduced quadrupole invariants $\langle Q^2 \rangle$ and $\langle \cos(3\delta) \rangle$, ground state is weakly deformed with $\beta = 0.15$; consistent with oblate-like deformation (2014Br05, Coulomb excitation). $T_{1/2}$: from 1993Wa03. Others: 11.3 s 2 (1992Ro21), 11.2 s 10 (1972Fi12, 1971JoZK, 1972HuZL), 11.3 s 5 (1970Ha18, 1969Ha03), 9.6 s 2 (1968De01). Weighted average of all the values is 10.78 s 18. $\% \alpha$: weighted average of 13.3 5 (1997Ba21, from correlating α particles from ^{186}Pb decay with subsequent ^{182}Hg decays) and 15.2 8 (1980Sc09, from a comparison of α-particle intensities of ^{182}Hg and its daughter nucleus ^{178}Pt in the same spectrum. Other: $\% \alpha = 9$ 2 was determined from a comparison of K x ray and α-particle intensities (1970Ha18). This method is less precise because the decay scheme of ^{182}Hg is not well known, and therefore the contribution of x rays due to internal conversion cannot be accurately calculated.
328.12	(0+)	B E		Based on deduced quadrupole invariants $\langle Q^2 \rangle$ and $\langle \cos(3\delta) \rangle$, first excited state is prolate deformed (2014Br05, Coulomb excitation).
351.7 [#] 3	2+	ABCDE	29.2 ps 16	$T_{1/2}$: others: 28.4 ps 21 (2009Gr09), 29.7 ps 18 (deduced from B(E2) values in Coulomb excitation). $Q(\text{transition}) = 4.1$ 2, $\beta_2 = 0.15$ 1 (2010Sc03).
548.3 [@] 5	2+	CDE	9.5 ps +27-22	$T_{1/2}$: deduced by evaluator from B(E2) = 0.37 +4-3 from g.s. and branching ratios supplied by authors in May 16, 2014 e-mail reply. Using B(E2) = 2.9 7 for 335.0+ to 548.2+ level gives $T_{1/2} = 9.0$ ps +60-37, consistent with that obtained from B(E2) value for g.s. to 548 level. B(E2)(from 0,0+) = 0.37 +4-3 (2014Br05). B(E2)(from 335,0+) = 2.9 7 (2014Br05). B(E2)(from 352,2+) = 0.97 +38-32 (2014Br05). $T_{1/2}$: others: 24.7 ps 10 (2009Gr09), 26.1 ps ⁹⁻⁸ (2014Br05, deduced from B(E2) values in Coul. ex.). $Q(\text{transition}) = 7.4$ 2, $\beta_2 = 0.26$ 1 (2010Sc03). $T_{1/2}$: other: 5.68 ps 35 (2009Gr09). $Q(\text{transition}) = 8.0$ 8, $\beta_2 = 0.29$ 3 (2010Sc03).
613.2 [@] 4	4+	A CDE	25.7 ps 8	
946.4 [@] 5	6+	A CDE	6.3 ps 4	
1124.8 [#] 8	(4+)	CDE		
1296.4 5		CD	<53 ps	
1360.0 [@] 5	8+	A CD	1.94 ps 21	$T_{1/2}$: other: 2.01 ps 21 (2009Gr09). $Q(\text{transition}) = 8.4$ 9, $\beta_2 = 0.30$ 3 (2010Sc03).
1384.9 ^a 6		CD	13.5 ps 16	
1532.9 ^c 6		CD		
1573.4 ^b 7		CD		
1763.7 ^a 6		CD	2.63 ps 35	
1768.4 ^{&} 6	(5-)	CD	24 ps 8	
1823.5 8		CD		

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Adopted Levels, Gammas (continued) ^{182}Hg Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	XREF	T _{1/2} [§]	Comments
1846.9@ 6	10+	CD	0.998 ps 22	T _{1/2} : other: 0.83 ps 21 (2009Gr09). Q(transition)=7.7 11, $\beta_2=0.28$ 6 (2010Sc03).
1946.1 ^c 6		CD		
2007.6& 6	(7-)	CD	25.9 ps 14	Q(transition)=6.6 12, $\beta_2=0.24$ 4 (2010Sc03).
2013.1 ^b 7		CD		
2210.9 ^a 7		CD	2.1 ps 16	
2314.9 ^b 7		CD	15.1 ps 22	
2323.5& 6	(9-)	CD	6.31 ps 35	Q(transition)=7.6 9, $\beta_2=0.27$ 3 (2010Sc03).
2399.4@ 8	12+	CD		
2412.5 ^c 8		CD		
2687.1 ^b 8		CD		
2713.5& 7	(11-)	CD	2.15 ps 21	Q(transition)=8.4 12, $\beta_2=0.30$ 4 (2010Sc03).
2722.0 ^a 13		CD		
2929.2 ^c 10		CD		
3010.1@ 10	14+	CD		
3111.5 ^b 9		CD		
3165.6& 8	(13-)	CD	0.97 ps 35	Q(transition)=8.0 28, $\beta_2=0.29$ 10 (2010Sc03).
3289.8 ^a 15		CD		
3486.3 ^c 14		CD		
3573.5 ^b 11		CD		
3647.1& 10	(15-)	CD	<2.7 ps	
3671.5@ 11	16+	CD		
3908.8 ^a 18		D		
4070.9 ^b 15		D		
4095.3 ^c 17		D		
4140.6& 11	(17-)	CD		
4378.3@ 15	18+	CD		
4565.8? ^a 21		D		
4619.9 ^b 18		D		
5108.1@ 18	(20+)	D		

[†] From least-squares fit to E γ 's, assuming 0.3 keV uncertainty for E γ values quoted to tenth of a keV and 1 keV for others.

[‡] Based on $\gamma\gamma(\theta)$ DCO data in ($^{32}\text{S},4n\gamma$) (1995Bi02). The transitions are interpreted as $\Delta J=2$, stretched E2 from such data. In some cases RUL is used when level lifetimes are known.

[§] From recoil-distance Doppler-shift (RDDS) method in $^{96}\text{Mo}(^{88}\text{Sr},2n\gamma)$ reaction (2010Sc03). See also 2009Gr09 from the same group for lifetimes measurements of 2+ to 10+ states in g.s. band. Values in 2009Gr09 are generally somewhat lower than those in the analysis in 2010Sc03, the values from latter are adopted by the evaluators.

(A): K $\pi=0+$,oblate band.

@ (B): K $\pi=2+$,prolate band.

& (C): Possible K=0, octupole band.

^a (D): $\Delta J=(2)$ band.

^b (E): $\Delta J=(2)$ band.

^c (F): $\Delta J=(2)$ band.

 $\gamma(^{182}\text{Hg})$

E(level)	E $\gamma^{\dagger}$	I $\gamma^{\dagger}$	Mult. [§]	α	Comments
328	328#		(E0)		
351.7	351.7 3	100	E2	0.0672	B(E2)(W.u.)=55 3.
548.3	196	8.8 32	E0+M1+E2	4.7 13	$\alpha(\text{exp})=4.7$ 13 (2014Br05). Mult.: from $\alpha(\text{exp})=4.7$ 13, quoted by 2014Br05 (in reference 15) from ^{182}Tl decay results yet to be published. E γ : γ ray reported on the basis of ^{182}Tl decay results yet to be published (reference 15 in 2014Br05).
	213	6.5 23	[E2]	0.315	B(E2)(W.u.)=90 +40-50.
	548.3 5	100	[E2]	0.0217	B(E2)(W.u.)=12 4.
613.2	261.5 3	100	E2	0.162	B(E2)(W.u.)=253 8.
946.4	333.1 3	100	E2	0.0785	B(E2)(W.u.)=332 22.
1124.8	576.5 6	100 15			
	773.1#				This γ cannot be distinguished from strong 771.8 γ from 1384 level.
1296.4	682.2 10	22 6			

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Adopted Levels, Gammas (continued) $\gamma(^{182}\text{Hg})$ (continued)

E(level)	$E\gamma^\dagger$	$I\gamma^\dagger$	Mult. [§]	α	Comments
1296.4	748.2 5	100 13			
1360.0	413.7 3	100	E2	0.0433	B(E2)(W.u.)=380 40.
1384.9	771.8 8	100			
1532.9	586.3 4	100			
1573.4	627.5 6	100			
1763.7	379.1 4	100 13			
	816.7 6	88 13			
1768.4	471.9 4	100 12			
	1156.7 10	19 6	[E1]		B(E1)(W.u.)= 9×10^{-7} 5.
1823.5	526.7	100			E γ : from $^{154}\text{Gd}(^{32}\text{S}, 4n\gamma)$. Other: 527 4 in $^{96}\text{Mo}(^{88}\text{Sr}, 2n\gamma)$.
1846.9	487.0 4	100	E2	0.0287	B(E2)(W.u.)=328 8.
1946.1	411.9 $\frac{1}{2}^\ddagger$				
	586.3 4	100 11			
2007.6	183.9 8	36 5			
	239.4 4	100 10	[E2]	0.214 4	B(E2)(W.u.)=250 40.
	1060.9 7	27 5	[E1]		B(E1)(W.u.)= 1.00×10^{-6} 21.
2013.1	441.2 $\frac{1}{2}^\ddagger$				
	627.5 6	100 15			
2210.9	447.2 5	100 14			
	850.7 8	50 10			
2314.9	301.8 4	100 11			
	551.2 $\frac{1}{2}^\ddagger$	75			I γ : from 1995Bi02.
	955.2 $\frac{1}{2}^\ddagger$				
2323.5	315.9 4	100 9	[E2]	0.091	B(E2)(W.u.)=320 50.
	963.0 7	37 6	[E1]		B(E1)(W.u.)= 9.5×10^{-6} 18.
2399.4	552.5 5	100	(Q)		
2412.5	466.6 6	100 17			
	565.1 $\frac{1}{2}^\ddagger$				
2687.1	372.2 5	100 19			
	840.0 $\frac{1}{2}^\ddagger$				
2713.5	389.9 4	100 9	[E2]	0.0508	B(E2)(W.u.)=400 70.
	867.5 10	15 4	[E1]		B(E1)(W.u.)= 1.9×10^{-5} 6.
2722.0	511.1	100			E γ : from $^{154}\text{Gd}(^{32}\text{S}, 4n\gamma)$. Other: 512 3 in $^{96}\text{Mo}(^{88}\text{Sr}, 2n\gamma)$.
2929.2	516.6 10	100 33			
	529.8 $\frac{1}{2}^\ddagger$				
3010.1	610.7 6	100			
3111.5	424.4 5	100			
3165.6	452.1 4	100	[E2]	0.0345	B(E2)(W.u.)=490 180.
3289.8	567.8 9	100			
3486.3	557.1 9	100			E γ : 559.2 in $^{154}\text{Gd}(^{32}\text{S}, 4n\gamma)$.
3573.5	462.0 5	100			
3647.1	481.5 6	100	[E2]	0.0295	B(E2)(W.u.)>130.
3671.5	661.4 5	100			E γ : 663.1 in $^{154}\text{Gd}(^{32}\text{S}, 4n\gamma)$.
3908.8	619 $\frac{1}{2}^\ddagger$				
4070.9	497.4 $\frac{1}{2}^\ddagger$	100			
4095.3	609 $\frac{1}{2}^\ddagger$				
4140.6	493.4 5	100			
4378.3	706.8 9	100			
4565.8?	657 $\frac{1}{2}^\ddagger$				
4619.9	549 $\frac{1}{2}^\ddagger$				
5108.1	729.8 $\frac{1}{2}^\ddagger$				

[†] From $^{96}\text{Mo}(^{88}\text{Sr}, 2n\gamma)$, unless otherwise stated.[‡] Weak γ from $^{154}\text{Gd}(^{32}\text{S}, 4n\gamma)$ only (1995Bi02), intensity not given in 1995Bi02.[§] From $\Delta J=2$, quadrupole from DCO data and RUL.

Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)

 (F) $\Delta J=(2)$ band

Adopted Levels, Gammas

$Q(\beta^-) = -6480$ 60; $S(n) = 8580$ 60; $S(p) = -60$ 60; $Q(\alpha) = 6593$ 15 2012Wa38.

$S(2n) = 20190$ 80, $S(2p) = 2290$ 60, $Q(\epsilon p) = 7270$ 60 (2012Wa38).

^{182}Tl first identified by 1991Bo22 from mass separation of products from $\text{Th}(p,X)$ spallation reaction at $E(p) = 600$ MeV at the CERN/ISOLDE facility. Others: 1993BoZK, 1986Ke03 (6406 α group reported may or may not belong to the decay of ^{182}Tl).

^{182}Tl Levels

Cross Reference (XREF) Flags

A ^{186}Bi α Decay (14.8 ms)

B ^{186}Bi α Decay (9.8 ms)

E(level)	J π	XREF	T $_{1/2}$	Comments
0.0	(7+)		3.1 s 10	$\% \epsilon + \% \beta^+ = 97.5$ 25; $\% \alpha < 5$ (1997Ba21, 1991Bo22). $\% \alpha$: ≤ 5 (1997Ba21), < 4 (1993BoZK), < 5 (1991Bo22); no α observed by 1997Ba21 following decay of ^{186}Bi α decay. 1986Ke03 reported $E\alpha = 6406$ 10, in disagreement with $E\alpha = 6050$ from 1993BoZK. In a recent communication (e-mail reply of July 16, 2015, from C. Van Beveren, KU, Leuven, Belgium), the evaluator learned that a paper on the α decay of $^{182,184}\text{Tl}$ is forthcoming from the experiments by the Leuven group at ISOLDE-CERN facility. T $_{1/2}$: from decay curve for γ rays (1991Bo22). Others: 2.8 s 6 from decay curve for 6050 α and 2.0 s 3 from decay curve for β radiation (1993BoZK). Theoretical values of β -decay half-life of 3.88 s and α -decay half-life of 26.9 s (1997Mo25) suggest $\% \alpha = 13\%$. J π : possible β feeding of 8+ state in ^{182}Hg ; syst of neighboring thallium nuclides. 2003An27 also do not have much evidence for α decay from ^{182}Tl and do not confirm 6406 α from 1986Ke03 and 6050 α from 1993BoZK. E(level): this level may correspond to the ground state of ^{182}Tl .
0+x		A		
0+y		B		
108.5+y		B		
444+x		A		
520+x		A		

$\gamma(^{182}\text{Tl})$

E(level)	E γ	Mult.	α	Comments
108.5+y	108.5 5	E1	0.351 7	Mult.: from 2003An27, deduced from summed α +electron spectra and simulated comparisons.
444+x	444 1			
520+x	520 1			

Adopted Levels, Gammas

S(n)=11780 80; S(p)=1316 15; Q(α)=7066 6 2012Wa38.

S(2n)=21038 18, S(2p)=1153 18, Q(εp)=6547 20 (2012Wa38).

¹⁸²Pb isotope first produced by 1982HeZM in ¹⁰⁴Pd(⁸²Kr,4n) at 4.2-4.4 MeV/nucleon. Later works: 1984ScZQ in ⁹⁴Zr(⁹²Mo,4n) at 58 MeV; 1986Ke03 in ⁹⁴Mo(⁹⁰Zr,2n) at 321-390 MeV; 1987To09 in ¹⁴⁷Sm(⁴⁰Ca,5n) at 194 MeV; 1999To11 in ⁹²Zr(⁹²Mo,2n).

2009Se13, 2007De09: E=1.4 GeV; measured electromagnetic moments, and mean square charge radii using the Resonance Ionization Laser Ion Source (RILIS) at the ISOLDE (CERN) online mass separator. Uranium carbonite was used as the target.

Isotope-shift measurement by laser spectroscopy: 2009Se13, 2007De09 also 2006Se18).

Structure calculations (rotational bands, 0+ states): 2013Ya05, 2012Ca27, 2012No07, 2011Ga35, 2011To13, 2007Ha51, 2004Ro19, 2004Be27, 2001Ch54.

¹⁸²Pb Levels

Cross Reference (XREF) Flags

A ¹⁸⁶Po α Decay (28 μs)
B ¹⁴⁴Sm(⁴²Ca,4nγ)

E(level)	Jπ [†]	XREF	T _{1/2}	Comments
0.0	0+	AB	55 ms 5	%α=98; %ε+%β ⁺ =2. %ε+%β ⁺ =2 (from syst,2012Au07). (⟨r ² ⟩) ^{1/2} (rms charge radius)=5.3788 fm 35 (2013An02,evaluation) Predicted %α=92, %ε+%β ⁺ =8 based on calculated T _{1/2} (β)=1.38 s and T _{1/2} (α)=0.11 s (1997Mo25). T _{1/2} : from decay curve for α lines (1999To11). Others: 55 ms +40-35 (1987To09), 331 ms 158 (1984ScZQ). Measured δ⟨r ² ⟩(¹⁸² Pb- ²⁰⁸ Pb)=-1.299 fm ² 25 (2009Se13,2007De09,2006Se18), optical-isotope shifts by in-source laser spectroscopy. Uncertainty in isotope shift is 0.012 fm ² This result is consistent with a spherical shape (β ₂ =+0.05) for the g.s.
888.3 3	(2+)	B		
1119.5 4	(4+)	B		
1433.2 4	(6+)	B		
1825.5 5	(8+)	B		
2288.2 6	(10+)	B		
2812.2 8	(12+)	B		

[†] From systematics; probable band assignment.

[‡] (A): Kπ=(2+), prolate band.

γ(¹⁸²Pb)

E(level)	Eγ	Iγ
888.3	888.3 3	100
1119.5	231.2 2	100
1433.2	313.7 2	100
1825.5	392.3 3	100
2288.2	462.7 4	100
2812.2	524.0 4	100

(A) Kπ=(2+),
prolate band

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