Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 177, 1 (2021)	3-Sep-2021

Q(β^-)=96.6 *20*; S(n)=7112 *3*; S(p)=9490 *40*; Q(α)=−490 *40* 2021Wa16
S(2n)=12696 *3*, S(2p)=17390 *200* (syst) (2021Wa16).

^{194}Os produced and identified by 1951Li19 in successive thermal neutron capture in ^{192}Os target. Measured half-life of 700 d from decay curve of specific activity of iridium samples in equilibrium with ^{194}Os.

Other measurements:

2011Be08: search for α decay of ^{198}Pt to ^{194}Os using a natural 42.5 g sample of Pt by detecting γ rays using a low-background HPGe detector in the underground conditions of Gran Sasso National Laboratories (LNGS) of the INFN (Italy) over 1815.4 hours. The background spectrum of the detector was also measured for 1045.6 hours. No evidence was found for α decay of ^{198}Pt nuclide to g.s. and excited states of ^{194}Os. Deduced $T_{1/2}>4.7\times10^{17}$ y from observed counts=12±9 of 328.5γ (from ^{194}Ir decay, daughter of ^{194}Os decay), reduced to <27 counts at 90% confidence level with partial half-life>4.7×10^{17} y for all levels in ^{194}Os.

2014DrZZ: ^{186}W,^{187}Re,^{192}Os(^{136}Xe,Xγ),E=6 MeV/nucleon, measured Eγ, Iγ, $\gamma\gamma$-coin, in-beam and out-of-beam γ ray spectra using Gammasphere array at ATLAS-ANL facility. In-beam γ rays are reported at 219, 314, 383, 456, 530, 661 and 940 keV. Out-of-beam γ rays are reported at 194, 219, 314, 350, 383, 456, 530, 555, 661, 718 and 767 keV, implying a high-lying and high-spin isomer in ^{194}Os, analogous to those in ^{192}Os. In an alignment plot, the g.s. band was extended to 16^+, and a $K^\pi=3^-$ band was shown up to 13^-. Contacted Greg Lane at ANU, May 29, 2019, for further information. His reply of May 29, 2019 mentioned that details of this work will be forthcoming sometime within a year or so.

Mass measurement: 2013Sh30.

Additional information 1.

Theoretical structure references: consult the NSR database (www.nndc.bnl.gov/nsr/) for about 28 references dealing with nuclear structure calculations.

^{194}Os Levels

Cross Reference (XREF) Flags

A	^{194}Re β^- decay:mixed	D	^{193}Os(n,γ) E=thermal
B	^{192}Os(t,p)	E	^{198}Pt(^{136}Xe,Xγ)
C	^{192}Os(^{18}O,^{16}Oγ)		

E(level)[†]	J$^\pi$	$T_{1/2}$	XREF	Comments
0.0[#]	0^+	6.0 y *2*	ABCDE	%β^-=100 J$^\pi$: L(t,p)=0 from 0^+. $T_{1/2}$: from 1965Jo10 (decay curve of ^{194}Os and ^{194}Ir equilibrium mixture using an end-window proportional counter, followed for six years). Others: 5.8 y *4* (1964Wi07, preliminary value, measured over only 10 months), 700 d (1951Li19). Quadrupole deformation parameter $<\beta_2^2>^{1/2}$=0.147 *10* from isotope-shift measurement in 2020Ch33.
218.509[#] *6*	(2^+)	302 ps *50*	ABCDE	J$^\pi$: L(t,p)=(2) from 0^+. $T_{1/2}$: from (218γ in $LaBr_3$)(150-382 γ region in $LaBr_3$)(531γ in HPGe)(t) (2017Da06) in ^{192}Os(^{18}O,^{16}Oγ).
601.7[#] *4*	(4^+)		ABC E	J$^\pi$: L(t,p)=(4) from 0^+. $T_{1/2}$: (218γ in HPGe)(382γ in $LaBr_3$)(150-1000 γ region in $LaBr_3$)(t) gives FWHM=888 ps for the prompt response fit for the time-difference spectra (Fig. 7d 2017Da06).
656.540[@] *9*	(2^+)		BCD	J$^\pi$: L(t,p)=(2) from 0^+.
696.5[&] *5*	0^+		ABC	J$^\pi$: L(t,p)=0 from 0^+.
967.6[a] *8*	(3^+)		C	J$^\pi$: 749γ ΔJ=(1) to (2^+).
1063.2[&] *6*	(2^+)		BC	J$^\pi$: 366γ ΔJ=(2) to 0^+; possible member of excited 0^+ band.

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Adopted Levels, Gammas (continued)

^{194}Os Levels (continued)

E(level)†	Jπ	XREF	Comments
1090.5 *7*	(4+)	C	Jπ: 434γ ΔJ=(2) to (2+). 4+ assigned by 2017Da06 in (^{18}O,^{16}Oγ).
1131.8# *8*	(6+)	A C E	Jπ: 530.1γ ΔJ=(2) to (4+); member of g.s. band.
1140.5@ *10*	(4+)	C	Jπ: 484γ ΔJ=(2) to (2+); possible band member.
1284.7a *6*	(4+)	C	Jπ: 221γ ΔJ=(2) to (2+), 684γ to (4+); possible band member.
1311 *5*		B	E(level): probably a doublet from (t,p).
1446.7 *11*	(5+)	C	Jπ: 845γ to (4+). (5+) assigned by 2017Da06 in (^{18}O,^{16}Oγ).
1466 *5*		B	
1540 *8*	0+	B	Jπ: L(t,p)=0 from 0+.
1625.7@ *11*	(6+)	C	Jπ: 1024γ to (4+); possible band member.
1670.7a *12*	(5+)	BC	XREF: B(1668). Jπ: 386γ to (4+); possible band member.
1737 *8*		B	
1792.8# *13*	(8+)	C E	Jπ: 661γ ΔJ=(2) to (6+); band member.
1835 *8*	0+	B	Jπ: L(t,p)=0 from 0+.
1878 *8*		B	
1956 *8*		B	
2118 *10*		B	
2168 *10*		B	
x b	‡	A	
193.6+x b *6*	‡	A	
542.6+x b *7*	‡	A	
1096.5+x b *7*	‡	A	
y			A high-spin isomer at high excitation is implied from out-of-beam γ-ray data in ^{186}W,^{187}Re,^{192}Os(^{136}Xe,Xγ),E=6 MeV/nucleon reaction studied by 2014DrZZ. The details of this work are not yet available.

† From a least-squares fit to Eγ values, assuming 1 keV uncertainty when not stated.
‡ Expected to be high-spin (J=10-12), if each level is fed directly in β^- decay of ^{194}Re, (11−) isomer.
# Band(A): g.s. band.
@ Band(B): Possible band based on (2+).
& Band(C): Excited 0+ band.
a Band(D): Possible band based on (3+).
b Seq.(E): γ cascade.

γ(^{194}Os)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.@	α&	Comments
218.509	(2+)	218.511‡ *6*	100	0.0	0+	[E2]	0.247	B(E2)(W.u.)=45 *16* E_γ: other: 218.2 *3* from ^{194}Re β^- decay (2012Al05).
601.7	(4+)	383.3# *4*	100	218.509	(2+)	(E2)	0.0454	
656.540	(2+)	438.034‡ *8*	53 *8*	218.509	(2+)			I_γ: from ^{193}Os(n,γ) E=thermal. Other: Iγ(438)/Iγ(656)=22/7 in ^{192}Os(^{18}O,^{16}Oγ) is in severe disagreement with the value from ^{193}Os(n,γ).
		656.526‡ *16*	100	0.0	0+			I_γ: from ^{193}Os(n,γ).
696.5	0+	477.8# *5*	100	218.509	(2+)	(E2)		

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Adopted Levels, Gammas (continued)

γ(^{194}Os) (continued)

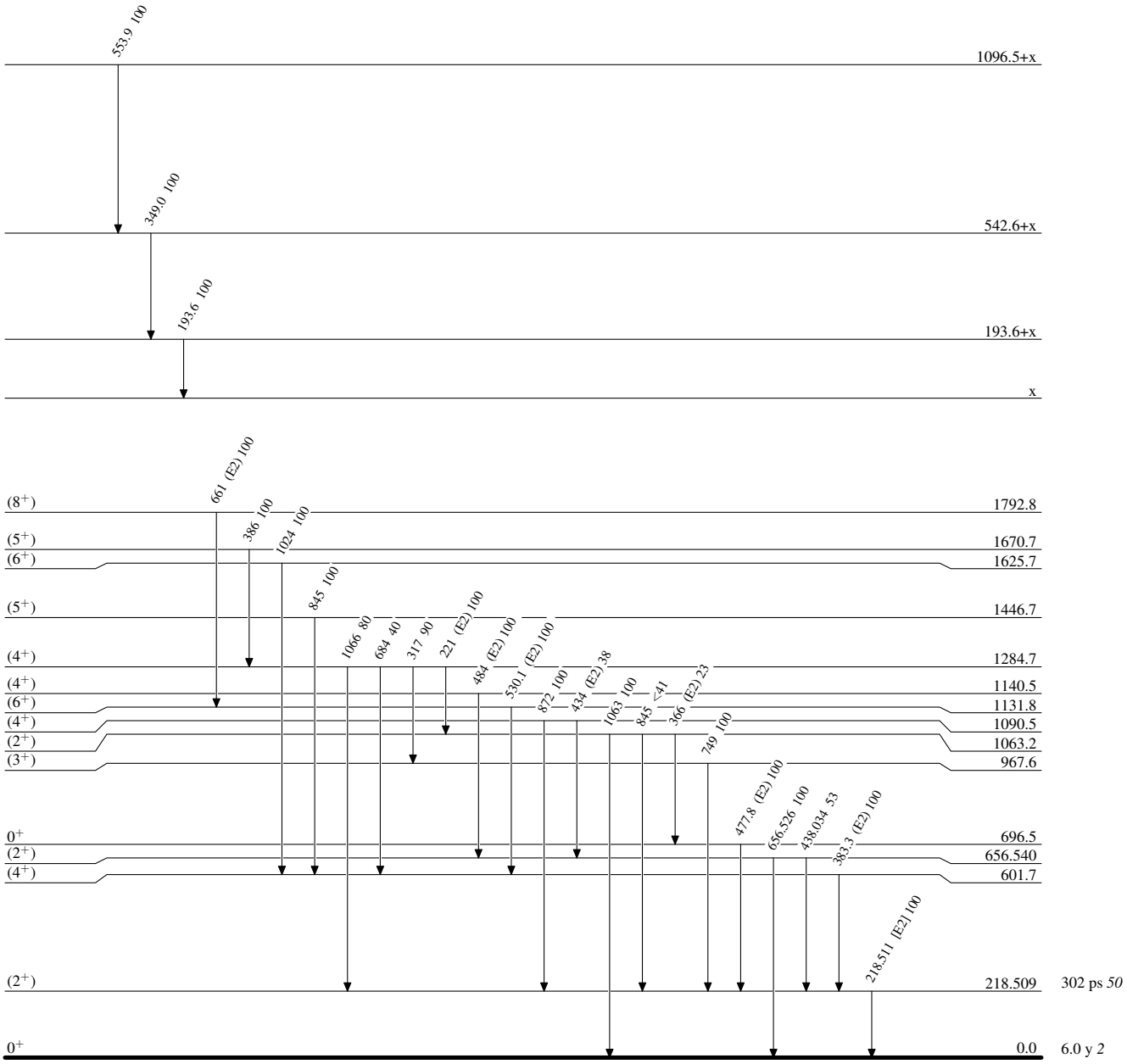
E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[@]	Comments
967.6	(3$^+$)	749[†]	100	218.509	(2$^+$)		E_γ: a 749γ is placed by 2001Wh01 in (^{136}Xe,Xγ) from a 2542 level, which is considered questionable and not adopted. Mult.: ΔJ=(1) from γγ(DCO) in (^{18}O,^{16}Oγ).
1063.2	(2$^+$)	366[†]	23[†]	696.5	0$^+$	(E2)	
		845[a†]	<41[†]	218.509	(2$^+$)		
		1063[†]	100[†]	0.0	0$^+$		
1090.5	(4$^+$)	434[†]	38[†]	656.540	(2$^+$)	(E2)	
		872[†]	100[†]	218.509	(2$^+$)		
1131.8	(6$^+$)	530.1[#] *6*	100	601.7	(4$^+$)	(E2)	
1140.5	(4$^+$)	484[†]	100	656.540	(2$^+$)	(E2)	
1284.7	(4$^+$)	221[†]	100[†]	1063.2	(2$^+$)	(E2)	
		317[†]	90[†]	967.6	(3$^+$)		
		684[†]	40[†]	601.7	(4$^+$)		
		1066[†]	80[†]	218.509	(2$^+$)		
1446.7	(5$^+$)	845[a†]	100	601.7	(4$^+$)		
1625.7	(6$^+$)	1024[†]	100	601.7	(4$^+$)		
1670.7	(5$^+$)	386[†]	100	1284.7	(4$^+$)		
1792.8	(8$^+$)	661[†]	100	1131.8	(6$^+$)	(E2)	E_γ: same value in (^{136}Xe,Xγ).
193.6+x		193.6[#] *6*	100	x			
542.6+x		349.0[#] *3*	100	193.6+x			
1096.5+x		553.9[#] *3*	100	542.6+x			

† From ^{192}Os(^{18}O,^{16}Oγ).
‡ From curved-crystal data in ^{193}Os(n,γ).
# From β^- decay.
@ ΔJ=2, Q from γγ(DCO) in (^{18}O,^{16}Oγ) with E2 more probable than M2, assuming that level in bands have half-lives <50 ns or so, typical resolving time of γγ-coin systems.
& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
a Multiply placed.

Adopted Levels, Gammas

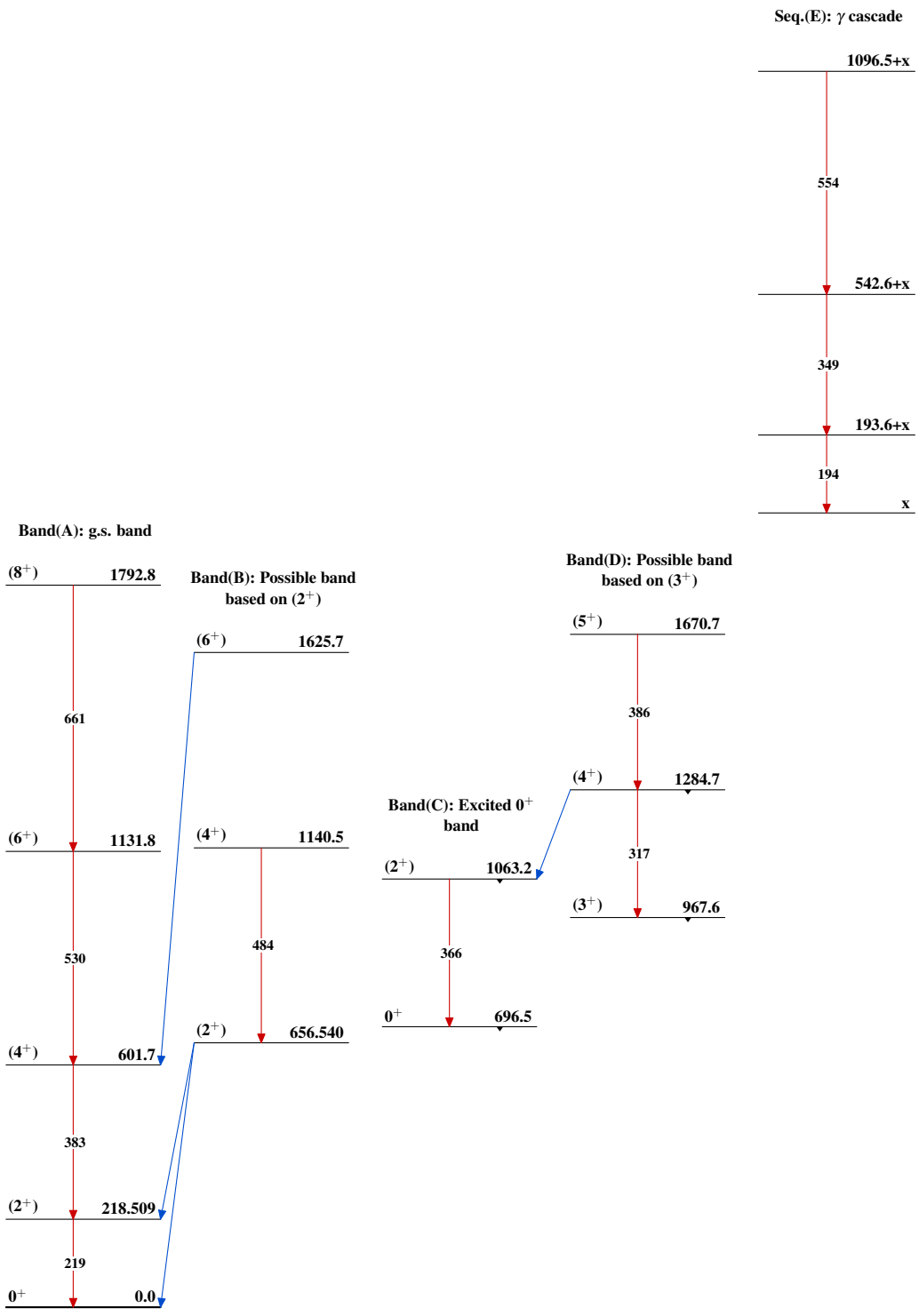
Level Scheme

Intensities: Relative photon branching from each level



$^{194}_{76}Os_{118}$

Adopted Levels, Gammas



$^{194}_{76}Os_{118}$