^{185}Os ε decay 1991Go23,1977Br22,1981El11

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. -c. Wu	NDS 106, 619 (2005)	1-Nov-2005

Parent: ^{185}Os: E=0.0; $J^\pi=1/2^-$; $T_{1/2}$=93.6 d *5*; Q(ε)=1012.8 *4*; %ε decay=100.0

Additional information 1.

Q(ε) value was deduced by various groups from the ratios of electron captures to several levels: Q(ε)=1014 *4* (1967Sc15), Q(ε)=1012 *3* (1969Co16), Q(ε)=1015.0 *7* (1970Sc06).

No β^+ was observed by 1950Bu51 (s); 1958Ma56 set an upper limit: $I(\beta^+)\leq 4.\times10^{-4}$ *3* from nonobservation of annihilation radiation (scin).

γ(θ): 1973Kr05.

γγ(H,θ): 1972BeYN. Other measurements: 1957Bi88, 1957Jo09, 1957Ma13, 1958Ma56, 1990Me15.

^{185}Re Levels

See 1972Be41, 1970St08, 1969Ba61 for γγ(θ), and 1981El11 for δ and J^π assignments derived from these measurements.

E(level)‡	J^π†	$T_{1/2}$	Comments
0.0	$5/2^+$	stable	
125.3581 *9*	$7/2^+$		g-factor=0.59 *23* if $T_{1/2}$=10.2 ps *15*, γγ(H,θ) (1972BeYN).
646.119 *4*	$1/2^+$		J^π: J=1/2 from γγ(θ).
717.432 *3*	$3/2^+$		J^π: J≠5/2,7/2 from γγ(θ).
768.93 *6*	$(5/2^+)$		
874.815 *13*	$3/2^+$		
880.282 *6*	$1/2^+$		J^π: J=1/2 from γγ(θ).
931.06 *2*	$(3/2)^+$		

† From Adopted Levels.

‡ Deduced by evaluator from a least-squares fit to γ-ray energies.

ε radiations

E(decay)	E(level)	Iε†	Log *ft*	Comments
(81.7 *4*)	931.06	0.049 *2*	8.57 *3*	εK= 0.116 *13*; εL= 0.632 *12*; εM+= 0.252 *4*
(132.5 *4*)	880.282	7.1 *3*	7.15 *3*	εK= 0.549 *12*; εL= 0.331 *4*; εM+= 0.1192 *13*
(138.0 *4*)	874.815	6.4 *3*	7.26 *3*	εK= 0.569 *12*; εL= 0.317 *4*; εM+= 0.1135 *12*
(243.9 *4*)	768.93	0.07 *2*	9.15[1u] *15*	εK= 0.500 *8*; εL= 0.363 *4*; εM+= 0.1372 *13*
(295.4 *4*)	717.432	5.0 *4*	8.28 *4*	εK= 0.746 *5*; εL= 0.1907 *9*; εM+= 0.0631 *3*
(366.7 *4*)	646.119	77 *3*	7.32 *2*	εK= 0.766 *4*; εL= 0.1767 *7*; εM+= 0.05766 *22*
(1012.8‡ *4*)	0.0	<8	>9.8[1u]	Iε: upper limit, 90% confidence level, deduced by evaluator from experimental K x ray intensity of 1991Go23, and transition intensity balance at each level. Previous value of 1.8% (1989Br28) was based on a less accurate experimental I(K x ray) value of 1969Co16.

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.

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γ(^{185}Re)

Iγ normalization: from ΣI(γ+ce)(g.s.)=96% *4*, based on I(ε+β$^+$)<8% to g.s..
γγ(θ): 1972Be41, 1970St08, 1969Ba61. See also 1981El11 for δ, and for J^π assignments derived from these measurements.

x-ray intensities relative to 10000 for 646γ.

x ray	Intensity	Detector	Reference
Kα$_2$	x ray 2690 *70*	HP Ge	1991Go23
Kα$_1$	x ray 4630 *120*	HP Ge	1991Go23
Kβ$_1$	x ray 1550 *50*	HP Ge	1991Go23
Kβ$_2$	x ray 430 *14*	HP Ge	1991Go23
K x ray	7000	scin	1957Bi88
K x ray	8200	scin	1957Jo09
K x ray	8300 *750*	Ge(Li)	1969Co16
L x ray/K x ray 1.6		pc, scin	1957Bi88

Other measurements: 1951Mi22, 1951Mi36.

E$_\gamma$[†]	I$_\gamma$[‡d]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[#]	δ[@]	α[e]	Comments
[x]47.4[&]									
[x]67.5[&]									
71.313 *2*	0.34 *14*	717.432	3/2$^+$	646.119	1/2$^+$	M1(+E2)	0.12 *+2−12*	2.67 *20*	α(L)= 2.0 *4*; α(M)= 0.47 *9*; α(N+..)= 0.14 *3* Iγ: Iγ=0.31 *16*, from 163γ-646γ coincidence intensity (1970Pl04).
[x]114.7[&]									
[x]117.5[&]									
121.2[c] *1*	0.03 *1*	768.93	(5/2$^+$)	646.119	1/2$^+$	(E2)		1.97	α(K)= 0.593; α(L)= 1.03; α(M)= 0.261; α(N+..)= 0.0779 Iγ: from 1971Be78. Transition was observed by 1968Ha39 in ce spectrum and by 1971Be78 in γγ-coincidence spectrum. 1977Br22 identified the peak at 121.2 keV as due to x-ray summing.
125.3581[b] *9*	0.438 *15*	125.3581	7/2$^+$	0.0	5/2$^+$	M1+E2	+0.18 *1*	2.76	α(K)= 2.26; α(L)= 0.387; α(M)= 0.0890; α(N+..)= 0.0273 δ: value recommended by 1976Kr21 and derived from +0.176 *17* (1966As02), +0.186 *12* (1970St08), and +0.186 *19* (1972Be41). δ=0.187 *37* derived by 1981El11 from measured A$_2$ and A$_4$ angular correlation coefficients of 1970St08 and 1972Be41.
[x]148.7[&]									
157.7[c]		874.815	3/2$^+$	717.432	3/2$^+$				Iγ: Iγ<2 from 1969Co16. This transition was observed by

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γ(^{185}Re) (continued)

E_γ [†]	I_γ [‡d]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	δ [@]	α [e]	Comments
									1968Ha39 in ce spectrum with Ice(K)(157.7γ)/Ice(K)(646.1γ)=0.0032. However, 1969Co16 did not observe it in their ce and γ spectra; upper limits were given: Ice(K)(157.7γ)/Ice(K)(646.1γ)<0.0004, Iγ(157.7γ)<2. 1971Be78 measured Iγ(157.7γ)=2±1.
x159.4[c]									This transition was not observed by 1970Pl04. Ice(K)(159γ)/Ice(K)(646γ)<0.00064. 1968Ha39 measured: Ice(K)(159γ)/Ice(K)(646γ)=0.0064.
162.852 *7*	0.726 *22*	880.282	1/2+	717.432	3/2+	M1		1.33	α(K)= 1.10; α(L)= 0.176; α(M)= 0.0402; α(N+..)= 0.0122
x185.7[&]									
x189.1[&]									
229.1[c]		874.815	3/2+	646.119	1/2+				Iγ: Iγ<2 from 1969Co16. Weak K line of this transition was observed by 1968Ha39. 1969Co16 did not observe any ce line nor photon belonging to a 229.1-keV transition. Upper limits were Ice(K)(229γ)/Ice(K)(646γ)<0.0004; Iγ(229γ)/Iγ(646γ)<0.0002.
234.157 *9*	0.529 *13*	880.282	1/2+	646.119	1/2+	M1		0.484	α(K)= 0.401; α(L)= 0.0636; α(M)= 0.0145; α(N+..)= 0.00438
592.074[b] *4*	1.69 *3*	717.432	3/2+	125.3581	7/2+	E2		0.0147	α(K)= 0.0114; α(L)= 0.00249
x594.9[&]									
646.116 *9*	100 *1*	646.119	1/2+	0.0	5/2+	E2		0.0120	α(K)= 0.00944; α(L)= 0.00196
x710.1[&]									
717.424 *12*	5.05 *5*	717.432	3/2+	0.0	5/2+	M1+E2	1.8 *6*	0.0132 *14*	α(K)= 0.0107 *12*; α(L)= 0.00189 *17*
749.46 *8*	0.0040 *5*	874.815	3/2+	125.3581	7/2+	[E2]		0.00868	α(K)= 0.00691; α(L)= 0.00133
x755[a]									
768.93 *6*	0.0045 *4*	768.93	(5/2+)	0.0	5/2+	[M1,E2]		0.015 *6*	α(K)= 0.012 *6*; α(L)= 0.0020 *8*
805.7	0.00005 *4*	931.06	(3/2)+	125.3581	7/2+	[E2]		0.00744	α(K)= 0.00596; α(L)= 0.00111
x836.2[&]									
874.813 *13*	8.07 *7*	874.815	3/2+	0.0	5/2+	M1		0.0152	α(K)= 0.0126; α(L)= 0.00193
880.523 *13*	6.63 *8*	880.282	1/2+	0.0	5/2+	E2		0.00618	α(K)= 0.00499; α(L)= 0.000894
									Iγ: other values: 6.8 *6* (1969Co16), 6.75 (1970Pl04), 6.7 *3* (1970Sc06). Iγ=6.17 *13* (1977Br22) is possibly a typographical error. Evaluator used a value of 6.71 *13* for averaging.
931.057 *15*	0.062 *2*	931.06	(3/2)+	0.0	5/2+	M1		0.0130	α(K)= 0.0108; α(L)= 0.00164

[†] From 1977Br22 (semi), unless otherwise indicated. Energies measured by 1968Ha39 (s ce), 1969Co16 (semi γ, s ce), 1970Sc06 (semi), and 1971He20 (semi) are in good agreement with those by 1977Br22. Other measurements: 1950Bu51, 1951Mi22, 1952Sw57, 1953Co13, 1955Pr44, 1957Bi88, 1957Jo09, 1957Ma13,

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γ(^{185}Re) (continued)

1958Ma56, 1960Ne03, 1967Me06, 1969AkZY, 1970Ba10, 1971Bb09.

‡ Weighted average of values from 1977Br22 and 1991Go23, unless otherwise noted. Iγ′s for all strong gammas measured by 1969Co16, 1970Pl04, 1970Sc06, and 1971Be78 agree very well with those given here. ΔIγ from 1977Br22 apparently did not include the uncertainty for the efficiency of the Ge(Li) detector. Evaluator added 2% in quadrature to the fractional uncertainty of Iγ.

From ce data of 1968Ha39, 1969Co16, and 1970Pl04. See 1974El08 for the ce data and the comparison with theory.

@ From ce data in ^{185}Os ε decay (1974El08), except as noted.

& Seen by 1968Ha39 in ce spectrum only.

a Seen by 1971Be78 in γγ-coincidence spectrum.

b From 1992Le19. Energies are relative to values from ^{169}Yb and ^{192}Ir standards (1980De40), corrected for the 1986 adjustment of the fundamental physical constants (1987Co39).

c The existence of this transition is uncertain.

d For absolute intensity per 100 decays, multiply by 0.78 *3*.

e 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.

x γ ray not placed in level scheme.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays