^{172}Ir ε decay (2.0 s) 1992Sc16,1994Da02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 75,199 (1995)	31-May-1995

Parent: ^{172}Ir: E=139 *10*; $J^\pi=(7^+)$; $T_{1/2}$=2.0 s *1*; Q(ε)=9840 *SY*; %ε+%β^+ decay=77 *3*
^{172}Ir-%ε+%β^+ decay: %α=23 *3* (1992Sc16).
1992Sc16: measured a, γ, $\alpha\gamma$, $\gamma\gamma$, $T_{1/2}$. Sources: ^{141}Pr(^{36}Ar,5n) E=234 MeV. Recoil products collected with a helium jet system. Only four gammas reported.
1994Da02: measured γ, $\gamma\gamma$, $\gamma\gamma(\theta)$, ce, ce γ coin. Source from ^{144}Sm(^{31}P,3n) E=150 MeV.
^{172}Ir (2.0 s) decays by $\varepsilon+\beta^+$ (77%) and α (23%) (1992Sc16).

^{172}Os Levels

E(level)	J^π	E(level)	J^π	E(level)	J^π	E(level)	J^π
0.0[†]	0^+	1339.53[#] *13*	(4^+)	1884.90[#] *14*	(6^+)	2374.8[@] *2*	$9^{(-)}$
227.77[†] *9*	2^+	1468.8[@] *2*	(3^-)	1918.9? *5*		2415.2[&] *2*	(8^-)
606.17[†] *11*	4^+	1525.02[†] *14*	8^+	1978.50[@] *14*	$7^{(-)}$	2429.9 *3*	
758.27[‡] *14*	0^+	1551.28[‡] *12*	6^+	2023.81[†] *16*	10^+	2439.1 *2*	
810.02[‡] *11*	2^+	1604.50[#] *13*	(5^+)	2061.33[&] *14*	(6^-)	2508.4 *3*	
918.79[#] *14*	2^+	1656.59[@] *15*	$5^{(-)}$	2093.66[‡] *13*	(8^+)	3098.4 *3*	
1054.49[†] *12*	6^+	1678.6? *4*		2140.8 *4*			
1107.95[#] *12*	(3^+)	1727.64[&] *16*	(4^-)	2257.6 *3*			
1137.88[‡] *12*	4^+	1806.71? *15*		2288.1 *2*			

[†] Band(A): g.s. band (yrast).
[‡] Band(B): $K^\pi=0^+$ β band.
[#] Band(C): $K^\pi=2^+$ γ band.
[@] Band(D): (α=1,π=−).
[&] Band(E): (α=0,π=−).

$\gamma(^{172}Os)$

Normalization of level scheme for absolute γ-ray intensities is not possible since the γ-ray intensities are most likely mixed for the 4.4-s and 2.0-s activities. However, the 2.0-s activity populates several high-spin levels (J=6-8) and the 4.4-s activity seems to populate only the low-spin levels (J≤4). log *ft* values are not deduced due to lack of knowledge of independent intensities from two isomers.

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[&]	Comments
227.8 *1*	100.0 *21*	227.77	2^+	0.0	0^+	E2	0.218	α(L)exp=0.077 *5* (1994Da02).
312.7 *1*	0.3 *1*	918.79	2^+	606.17	4^+	[E2]	0.082	
322.0 *1*	0.9 *3*	1978.50	$7^{(-)}$	1656.59	$5^{(-)}$	E2[#]	0.075	
327.9 *1*	1.0 *3*	1137.88	4^+	810.02	2^+	[E2]	0.071	
333.8 *1*	1.0 *5*	2061.33	(6^-)	1727.64	(4^-)	[E2]	0.067	
353.8 *2*	2.0 *10*	2415.2	(8^-)	2061.33	(6^-)	[E2]	0.057	
378.4 *1*	62.0 *13*	606.17	4^+	227.77	2^+	E2	0.047	α(L)exp=0.010 *2* (1994Da02). (378γ)(228γ)(θ) (1994Da02) consistent with 4-2-0 cascade.
396.3 *1*	2.0 *10*	2374.8	$9^{(-)}$	1978.50	$7^{(-)}$	(E2)[#]	0.042	
413.4 *1*	5.4 *12*	1551.28	6^+	1137.88	4^+	[E2]	0.037	

Continued on next page (footnotes at end of table)

^{172}Ir ε decay (2.0 s) 1992Sc16,1994Da02 (continued)

γ(^{172}Os) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	α &	$I_{(\gamma+ce)}$	Comments
448.4 *1*	40.5 *11*	1054.49	6^+	606.17	4^+	E2	0.030		I_γ: 27 *4* (1992Bo21); 30 *4* (1992Sc16). Mult.: α(K)exp=0.025 *3* (1994Da02) and (448γ)(378γ)(θ) (1994Da02). γγ(θ) is consistent with 6-4-2 cascade.
453.4 *1*	4.4 *7*	1978.50	$7^{(-)}$	1525.02	8^+				I_γ: value seems too high by a factor of at least 3 when compared to branching ratios from two (HI,xnγ) studies.
470.5 *1*	17.7 *9*	1525.02	8^+	1054.49	6^+	E2 #	0.027		
496.4 *1*	2.0 *10*	1604.50	(5^+)	1107.95	(3^+)				
496.8 *1*	1.6 *3*	1551.28	6^+	1054.49	6^+	E0+E2(+M1)	0.16 @ *4*		Mult.: α(K)exp=0.13 *3*, α(L)exp=0.046 *15* (1994Da02) and systematics. X(E0/E2)=0.06 *1* (1994Da02).
498.8 *1*	2.7 *5*	2023.81	10^+	1525.02	8^+	E2 #	0.02		
501.7 *1*	0.5 *2*	1107.95	(3^+)	606.17	4^+	[M1,E2]	0.05 *2*		
530.5 *1*	1.2 *2*	758.27	0^+	227.77	2^+	[E2]	0.020		(531γ)(228γ)(θ) (1994Da02) consistent with 0-2-0 cascade.
531.7 *1*	4.3 *4*	1137.88	4^+	606.17	4^+	E0+E2(+M1)	0.17 @ *3*		Mult.: α(K)exp=0.14 *2*, α(L)exp=0.06 *1* (1994Da02) and (532γ)(228γ)(θ) (1994Da02). γγ(θ) is consistent with 4-4-2 cascade, mult=Q for first transition. X(E0/E2)=0.09 *1* (1994Da02).
542.4 *1*	1.6 *2*	2093.66	(8^+)	1551.28	6^+				
545.4 *1*	3.0 *20*	1884.90	(6^+)	1339.53	(4^+)				
550.3 *1*	0.5 *2*	1604.50	(5^+)	1054.49	6^+				
568.7 *1*	0.6 *2*	2093.66	(8^+)	1525.02	8^+				
582.3 *1*	20.2 *8*	810.02	2^+	227.77	2^+	E0+E2(+M1)	0.06 @ *1*		Mult.: from α(K)exp=0.05 *1* (1994Da02) and (582γ)(228γ)(θ) (1994Da02). γγ(θ) is consistent with 2-2-0 cascade with mult=Q for first transition. X(E0/E2)=0.04 *1* (1994Da02).
602.1 *1*	2.5 *9*	1656.59	$5^{(-)}$	1054.49	6^+				
690.7 *2*	0.5 *2*	918.79	2^+	227.77	2^+	E0+E2(+M1)	0.17 @ *5*		Mult.: α(K)exp=0.14 *4* (1994Da02). X(E0/E2)=0.28 *9* (1994Da02).
733.3 *1*	4.0 *8*	1339.53	(4^+)	606.17	4^+				
758.3		758.27	0^+	0.0	0^+	(E0)		0.026 *4*	Mult.: α(K)exp>0.04 (1994Da02), no γ ray observed. $I_{(\gamma+ce)}$: deduced from X(E0/E2)=0.010 *3* (1994Da02).
809.9 *2*	6.3 *26*	810.02	2^+	0.0	0^+				
830.4 *1*	0.8 *2*	1884.90	(6^+)	1054.49	6^+				
862.4 *2*	1.0 *1*	1468.8	(3^-)	606.17	4^+				
868.6 [a] *3*	0.3 *2*	1678.6?		810.02	2^+				
880.1 *1*	3.6 *4*	1107.95	(3^+)	227.77	2^+				
890.2 *2*	0.9 *3*	2415.2	(8^-)	1525.02	8^+				

Continued on next page (footnotes at end of table)

^{172}Ir ε decay (2.0 s) 1992Sc16,1994Da02 (continued)

$\gamma(^{172}Os)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
924.0 *2*	0.7 *2*	1978.50	$7^{(-)}$	1054.49	6^+	1086.3 *3*	1.2 *2*	2140.8		1054.49	6^+
945.1 *1*	3.4 *7*	1551.28	6^+	606.17	4^+	1108.9[a] *4*	0.5 *2*	1918.9?		810.02	2^+
983.4 *2*	0.4 *2*	2508.4		1525.02	8^+	1112.1 *2*	0.9 *2*	1339.53	(4^+)	227.77	2^+
996.7[a] *1*	0.7 *2*	1806.71?		810.02	2^+	1121.9 *2*	1.2 *2*	1727.64	(4^-)	606.17	4^+
998.2 *1*	2.0 *2*	1604.50	(5^+)	606.17	4^+	1203.1 *2*	0.7 *2*	2257.6		1054.49	6^+
1006.7 *1*	1.7 *2*	2061.33	(6^-)	1054.49	6^+	1233.6 *1*	1.2 *2*	2288.1		1054.49	6^+
1039.1 *1*	0.9 *2*	2093.66	(8^+)	1054.49	6^+	1241.4 *3*	0.7 *2*	1468.8	(3^-)	227.77	2^+
1050.5 *1*	1.7 *2*	1656.59	$5^{(-)}$	606.17	4^+	1375.4 *2*	0.8 *2*	2429.9		1054.49	6^+
1074.6 *2*	2.0 *10*	3098.4		2023.81	10^+	1384.6 *1*	1.4 *3*	2439.1		1054.49	6^+

† From 1994Da02. Iγ's for many γ rays are probably mixed, contributed by the 2.0-s and 4.4-s activities.
‡ From ce data (1994Da02), unless otherwise stated.
# From $\gamma(\theta)$ or $\gamma\gamma(\theta)$ in (HI,xnγ).
@ Deduced from α(K)exp (1994Da02).
& 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] Placement of transition in the level scheme is uncertain.

^{172}Ir ε decay (2.0 s) 1992Sc16,1994Da02

Decay Scheme

Intensities: Relative $I_{(\gamma+ce)}$

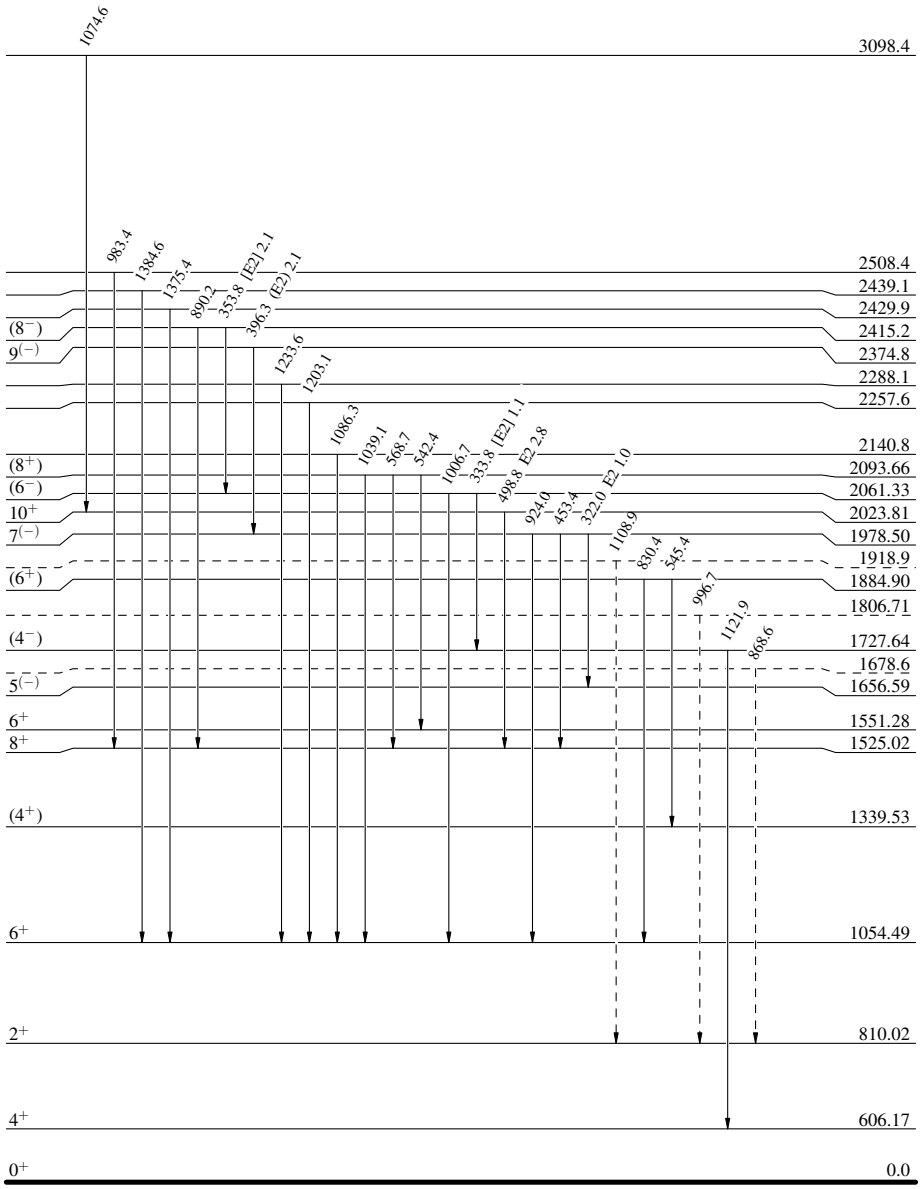
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)

(7^+) 139 2.0 s *1*

$\%\varepsilon + \%\beta^+ = 77$ $Q_\varepsilon = 9840$ *SY*

$^{172}_{77}Ir_{95}$



$^{172}_{76}Os_{96}$

^{172}Ir ε decay (2.0 s) 1992Sc16,1994Da02

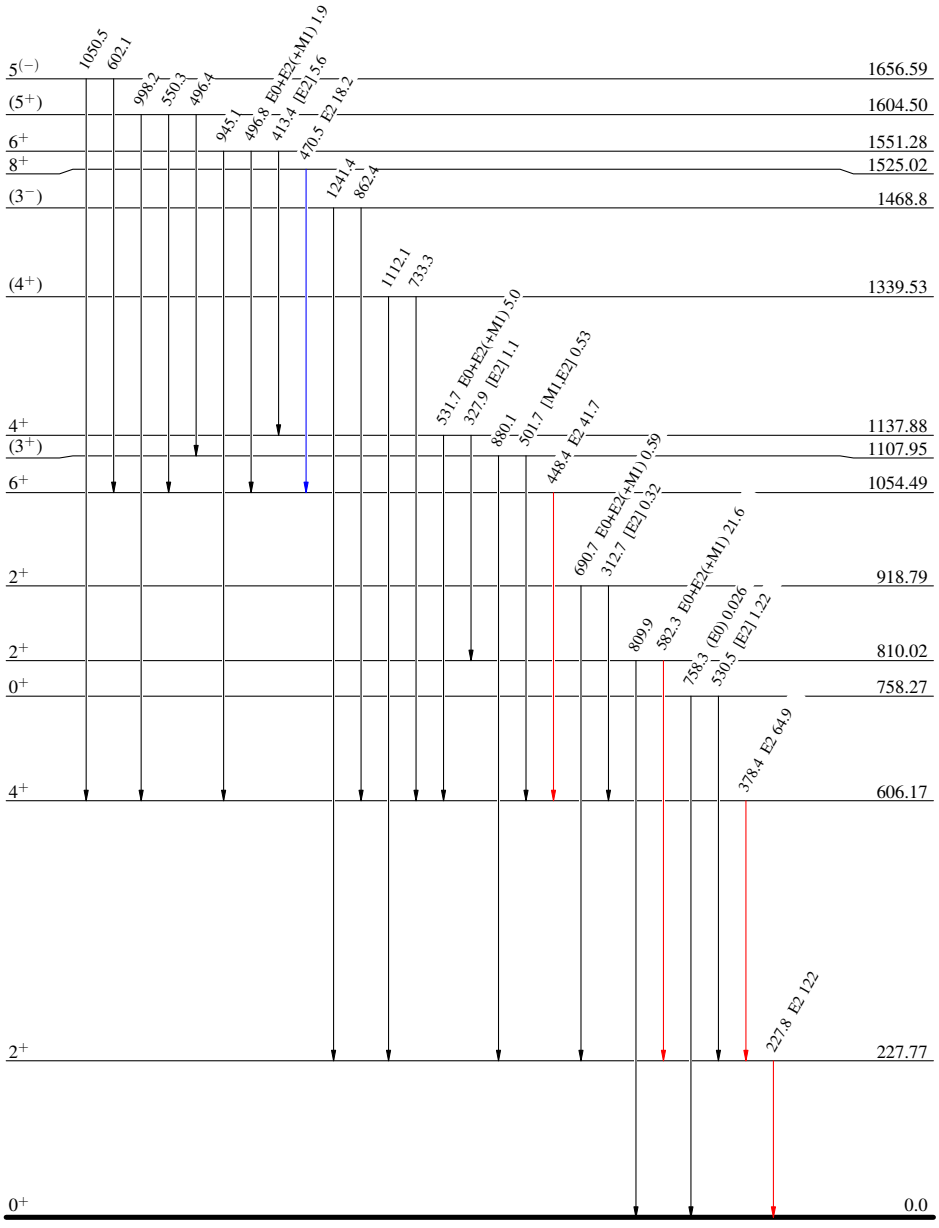
Decay Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$

Legend

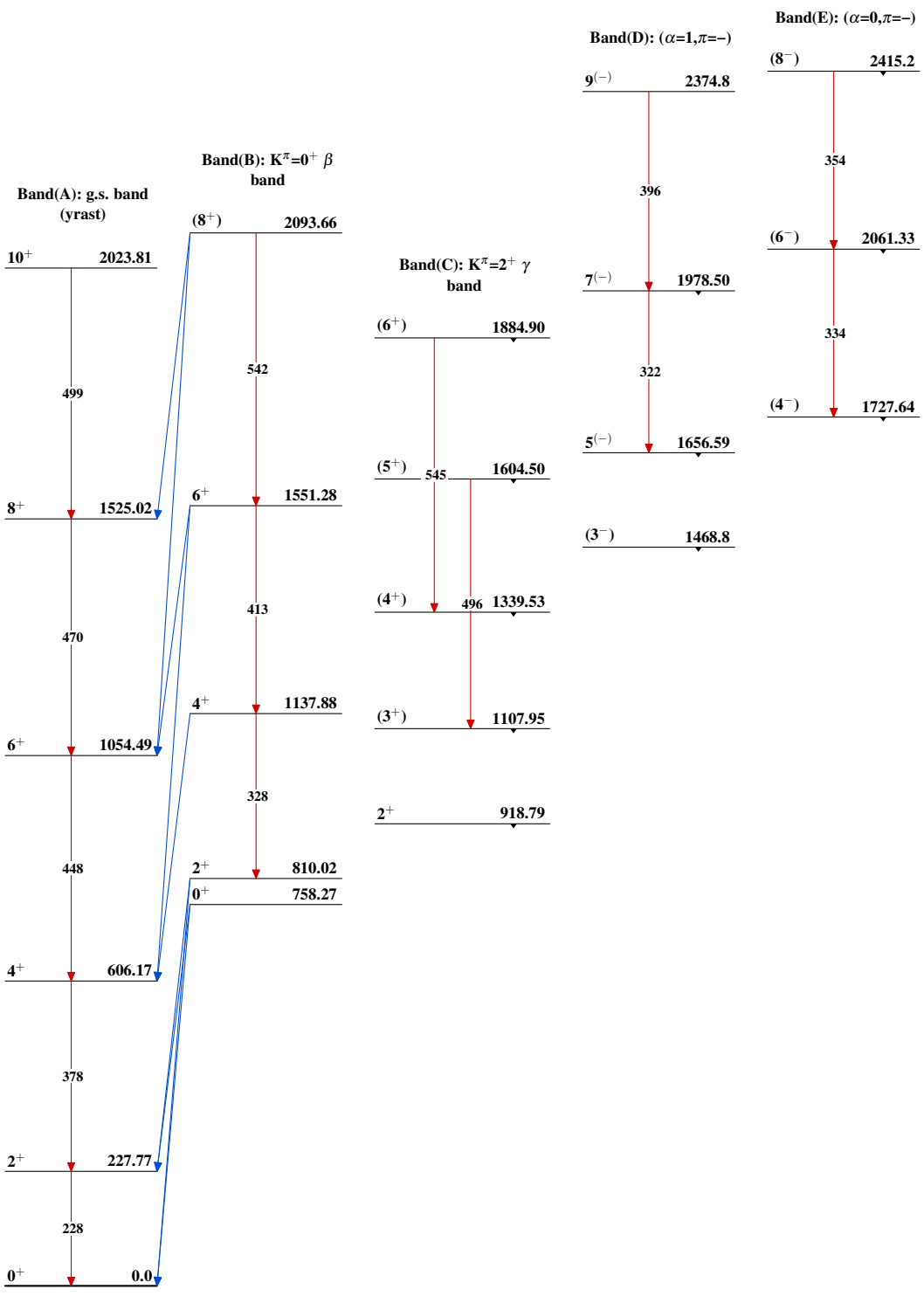
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

(7^+) 139 2.0 s *1*
$\%\varepsilon + \%\beta^+ = 77$ $Q_\varepsilon = 9840$ *SY*
$^{172}_{77}Ir_{95}$



$^{172}_{76}Os_{96}$

^{172}Ir ε decay (2.0 s) 1992Sc16,1994Da02



$^{172}_{76}Os_{96}$