^{151}Er IT decay (0.58 s) 1997Co24,1988Ba02,1980Ja16

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110,1 (2009)	20-Nov-2008

Parent: ^{151}Er: E=2585.5 *6*; $J^{\pi}=(27/2^-)$; $T_{1/2}$=0.58 s *2*; %IT decay=95.3 *4*

^{151}Er-%IT decay: from ratio of intensities of 597.4γ and 789.3γ in ^{151}Ho and summed intensities of 1548.2γ, 1140.4γ, 1495.3 and 801.8γ in ^{151}Er from the decay of 0.58-s isomer, $\%I(\varepsilon+\beta^+)$=4.7 *4*. Thus %IT=95.3 *4*. It should be pointed out that in the level scheme of 1997Co24, the the total transition intensity feeding the g.s. is 93.1 *19*, somewhat less than the adopted %IT=95.3 *4*, yet agrees within the uncertainties.

1997Co24: ^{96}Mo(^{58}Ni,2pn) E=4.4 MeV/nucleon. Measured Eγ, Iγ, $\gamma\gamma$, ce. Mass-separated source. Conversion electrons measured with a mini-orange magnetic spectrometer.

1988Ba02: ^{92}Mo(^{64}Zn,N4P) and ^{96}Mo(^{58}Ni,2pn). Measured: γ, $\gamma\gamma$, Xγ, ce, γce. A total of six gamma rays were reported.

1980Ja16: ^{141}Pr,$^{144,\ 147}$Smbarded with ^{12}C, ^{14}N, ^{16}O beams of E=70-130 MeV. Measured: delayed $\gamma\gamma$, multiplicity, excitation functions. Isotopic identification from cross bombardment, excitation functions. 1980Bo07 assigned two isomers (45 ns *5* and 37 ns *10*) to ^{151}Er. 1980Ja16, however, give them as one isomer belonging to ^{152}Ho on the basis that they are observed in the ^{141}Pr+^{16}O bombardment also.

Other: 1980Bo07.

Some authors are common in 1997Co24 and 1988Ba02.

^{151}Er Levels

All configurations are from 1997Co24.

E(level)†	J^{π}‡	$T_{1/2}$	Comments
0.0	$(7/2^-)$		Configuration=$\nu f_{7/2}$.
801.7 *2*	$(9/2^-)$		Configuration=$\nu h_{9/2}$.
1140.3 *2*	$(13/2^+)$	10 ns *3*	$T_{1/2}$: from γ(t), pulsed beam (1980Ja16). Configuration=$(\nu f_{7/2}\otimes 3^-)\otimes\nu i_{13/2}$.
1495.8 *2*	$(9/2^-)$		Configuration=$\nu f_{7/2}\otimes 2^+$. 354.2γ and 692.8γ placed from this level by 1990Ak01 in ^{151}Tm ε decay (4.17 s) study are not reported by 1997Co24.
1548.2 *2*	$(11/2^-)$		Configuration=$\nu f_{7/2}\otimes 2^+$. 408.3γ placed from this level by 1990Ak01 in ^{151}Tm ε decay (4.17 s) study is not reported by 1997Co24.
1720.9 *2*	$(11/2^+)$		Configuration=$\nu f_{7/2}\otimes 3^-$.
2075.0 *2*	$(13/2^+)$		
2211.7 *2*	$(15/2^+)$		718.0γ and 1411.0γ placed from this level by 1990Ak01 in ^{151}Tm ε decay (4.17 s) study are not reported by 1997Co24.
2239.4 *2*	$(17/2^+)$		Configuration=$\nu f_{7/2}\otimes 5^-$.
2528.1 *3*	$(21/2^+)$		Configuration=$\nu f_{7/2}\otimes 7^-$.
2585.8 *4*	$(27/2^-)$	0.58 s *2*	J^{π}: 1980Ja16 measured delayed γ multiplicity: 3.4 *5*. Configuration=$\pi h^2_{11/2}\otimes\nu f_{7/2}$. $T_{1/2}$: from 'Adopted Levels'. Half-life of fully-ionized (bare) atom ($^{151}Er^{68+}$)=19 s *3* (2003Li42), where ^{151}Er was produced in the fragmentation of ^{209}Bi beam at 900 MeV/nucleon followed by mass separation using fragment-recoil separator and storing the fragments in cooler ring (ESR) at GSI facility.

† From least-squares fit to Eγ's, assuming Δ(Eγ)=0.2 keV when not given.

‡ From 'Adopted Levels'.

γ(^{151}Er)

1997Co24 state that some of the γ-transition placements by 1990Ak01 in ^{151}Tm ε decay (4.17 s) study are in conflict with their work. Apparently, the details of the work by 1997Co24 are in a thesis by R. Collatz, KFA Julich (1994) (reference 8 in 1997Co24).
Additional information 1.

E_γ	I_γ[‡][b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[c]	$I_{(\gamma+ce)}$[†][b]	Comments
28[a]	≈0.3	2239.4	(17/2$^+$)	2211.7	(15/2$^+$)	[M1]	19.2	≈6[a]	ce(L)/(γ+ce)=0.742 *7*; ce(M)/(γ+ce)=0.165 *3*; ce(N+)/(γ+ce)=0.0442 *9* ce(N)/(γ+ce)=0.0384 *8*; ce(O)/(γ+ce)=0.00553 *11*; ce(P)/(γ+ce)=0.000303 *6* $I_{(\gamma+ce)}$: Estimated (by evaluator) from intensity balance. α: Assumed Δ(Eγ)=1 keV and mult=M1.
57.7	0.074 *3*	2585.8	(27/2$^-$)	2528.1	(21/2$^+$)	E3	1257 *25*	93.0 *19*	$I_{(\gamma+ce)}$: estimated from I(γ+ce)(288.7γ). I_γ: based on I(γ+ce)=95.3 (1988Ba02) and α(E3) (only L and higher shells considered for α; K-shell binding energy is 57.49 keV). E_γ: seen only in ce spectrum in 1988Ba02. Mult.: from a fit of observed ce(L) line with theoretical L subshell ratios (1988Ba02).
136.9[a]	1.9 *1*	2211.7	(15/2$^+$)	2075.0	(13/2$^+$)	(M1)	1.162	4.0[a] *2*	ce(K)/(γ+ce)=0.451 *4*; ce(L)/(γ+ce)=0.0674 *11*; ce(M)/(γ+ce)=0.01495 *24*; ce(N+)/(γ+ce)=0.00402 *7* ce(N)/(γ+ce)=0.00349 *6*; ce(O)/(γ+ce)=0.000504 *8*; ce(P)/(γ+ce)=2.78×10^{-5} *5*
225.3[a]	0.3 *1*	1720.9	(11/2$^+$)	1495.8	(9/2$^-$)	[E1]	0.038	0.3[a] *1*	
288.7[@] *2*	86.3 *18*	2528.1	(21/2$^+$)	2239.4	(17/2$^+$)	E2[&]	0.0776	93.0 *19*	ce(K)/(γ+ce)=0.0523 *7*; ce(L)/(γ+ce)=0.01527 *22*; ce(M)/(γ+ce)=0.00358 *5*; ce(N+)/(γ+ce)=0.000926 *14* ce(N)/(γ+ce)=0.000819 *12*; ce(O)/(γ+ce)=0.0001048 *15*; ce(P)/(γ+ce)=2.67×10^{-6} *4* Additional information 6.
338.5[@] *2*	2.0 *1*	1140.3	(13/2$^+$)	801.7	(9/2$^-$)	(M2)[#]	0.372	2.7 *1*	ce(K)/(γ+ce)=0.2191 *25*; ce(L)/(γ+ce)=0.0404 *6*; ce(M)/(γ+ce)=0.00923 *14*; ce(N+)/(γ+ce)=0.00248 *4* ce(N)/(γ+ce)=0.00216 *4*; ce(O)/(γ+ce)=0.000308 *5*; ce(P)/(γ+ce)=1.606×10^{-5} *24* Additional information 3. I_γ: From I(γ+ce) and α. Other: 0.91 *20* (1988Ba02).
354.0[a]	1.3 *1*	2075.0	(13/2$^+$)	1720.9	(11/2$^+$)	(M1)[#]	0.0858	1.4[a] *1*	ce(K)/(γ+ce)=0.0666 *9*; ce(L)/(γ+ce)=0.00974 *14*; ce(M)/(γ+ce)=0.00215 *3*; ce(N+)/(γ+ce)=0.000579 *9* ce(N)/(γ+ce)=0.000503 *7*; ce(O)/(γ+ce)=7.28×10^{-5} *11*; ce(P)/(γ+ce)=4.05×10^{-6} *6*

^{151}Er IT decay (0.58 s) 1997Co24,1988Ba02,1980Ja16 (continued)

γ(^{151}Er) (continued)

E_γ	I_γ[‡][b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[c]	$I_{(\gamma+ce)}$[†][b]	Comments
									ce(K)/(γ+ce)=0.0666 *9*; ce(L)/(γ+ce)=0.00974 *14*; ce(M)/(γ+ce)=0.00215 *3*; ce(N+)/(γ+ce)=0.000579 *9* ce(N)/(γ+ce)=0.000503 *7*; ce(O)/(γ+ce)=7.28×10^{-5} *11*; ce(P)/(γ+ce)=4.05×10^{-6} *6*
526.8[a]	1.6 *1*	2075.0	(13/2$^+$)	1548.2	(11/2$^-$)	[E1]	0.00498	1.6[a] *1*	ce(K)/(γ+ce)=0.00420 *6*; ce(L)/(γ+ce)=0.000587 *9*; ce(M)/(γ+ce)=0.0001290 *18*; ce(N+)/(γ+ce)=3.44×10^{-5} *5* ce(N)/(γ+ce)=2.99×10^{-5} *5*; ce(O)/(γ+ce)=4.27×10^{-6} *6*; ce(P)/(γ+ce)=2.26×10^{-7} *4*
580.4[a]	1.6 *1*	1720.9	(11/2$^+$)	1140.3	(13/2$^+$)	(M1)[#]	0.0238	1.6[a] *1*	ce(K)/(γ+ce)=0.0197 *3*; ce(L)/(γ+ce)=0.00283 *4*; ce(M)/(γ+ce)=0.000625 *9*; ce(N+)/(γ+ce)=0.0001681 *24* ce(N)/(γ+ce)=0.0001457 *21*; ce(O)/(γ+ce)=2.11×10^{-5} *3*; ce(P)/(γ+ce)=1.185×10^{-6} *17*
801.6[@] *2*	2.5 *1*	801.7	(9/2$^-$)	0.0	(7/2$^-$)	[M1,E2]		2.5 *1*	Additional information 2.
919.3[a]	0.3 *1*	1720.9	(11/2$^+$)	801.7	(9/2$^-$)	[E1]		0.3[a] *1*	
935.0[a]	0.7 *1*	2075.0	(13/2$^+$)	1140.3	(13/2$^+$)	[M1,E2]		0.7[a] *1*	
1071.4[a]	2.4 *1*	2211.7	(15/2$^+$)	1140.3	(13/2$^+$)	[M1,E2][#]		2.4[a] *1*	
1098.9[@] *2*	86.4 *18*	2239.4	(17/2$^+$)	1140.3	(13/2$^+$)	E2[&]	0.00277	86.6 *18*	ce(K)/(γ+ce)=0.00232 *4*; ce(L)/(γ+ce)=0.000348 *5*; ce(M)/(γ+ce)=7.72×10^{-5} *11*; ce(N+)/(γ+ce)=2.06×10^{-5} *3* ce(N)/(γ+ce)=1.79×10^{-5} *3*; ce(O)/(γ+ce)=2.55×10^{-6} *4*; ce(P)/(γ+ce)=1.322×10^{-7} *19* Additional information 5.
1140.2[@] *2*	87.0 *18*	1140.3	(13/2$^+$)	0.0	(7/2$^-$)	(E3)[&]	0.00539	87.5 *18*	ce(K)/(γ+ce)=0.00437 *6*; ce(L)/(γ+ce)=0.000767 *11*; ce(M)/(γ+ce)=0.0001733 *25*; ce(N+)/(γ+ce)=4.64×10^{-5} *7* ce(N)/(γ+ce)=4.02×10^{-5} *6*; ce(O)/(γ+ce)=5.64×10^{-6} *8*; ce(P)/(γ+ce)=2.65×10^{-7} *4* IP/T=2.45E−7 4. Additional information 4.
1495.9[a]	0.3 *1*	1495.8	(9/2$^-$)	0.0	(7/2$^-$)	[M1,E2]		0.3[a] *1*	
1548.2[a]	2.8 *2*	1548.2	(11/2$^-$)	0.0	(7/2$^-$)	[E2]		2.8[a] *2*	

† From 1997Co24.
‡ Deduced by the evaluator from I(γ+ce) if 1997Co24 and α from BrIcc code. Uncertainties for I(γ+ce) were not given by 1997Co24. These are assumed as 2% for three (289, 1099 and 1140) strong gamma rays and 5-10% for the others in comparison to those quoted in 1988Ba02, a study done at the same laboratory.
# From ce data in 1997Co24; the details of these data are not available.
@ From 1988Ba02.
& From 'Adopted Gammas'.

$^{151}_{68}Er_{83}$-3

γ(^{151}Er) (continued)

[a] γ from 1997Co24 only, no uncertainties are provided by the authors.
[b] Absolute intensity per 100 decays.
[c] 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.

$^{151}_{68}$Er$_{83}$-4

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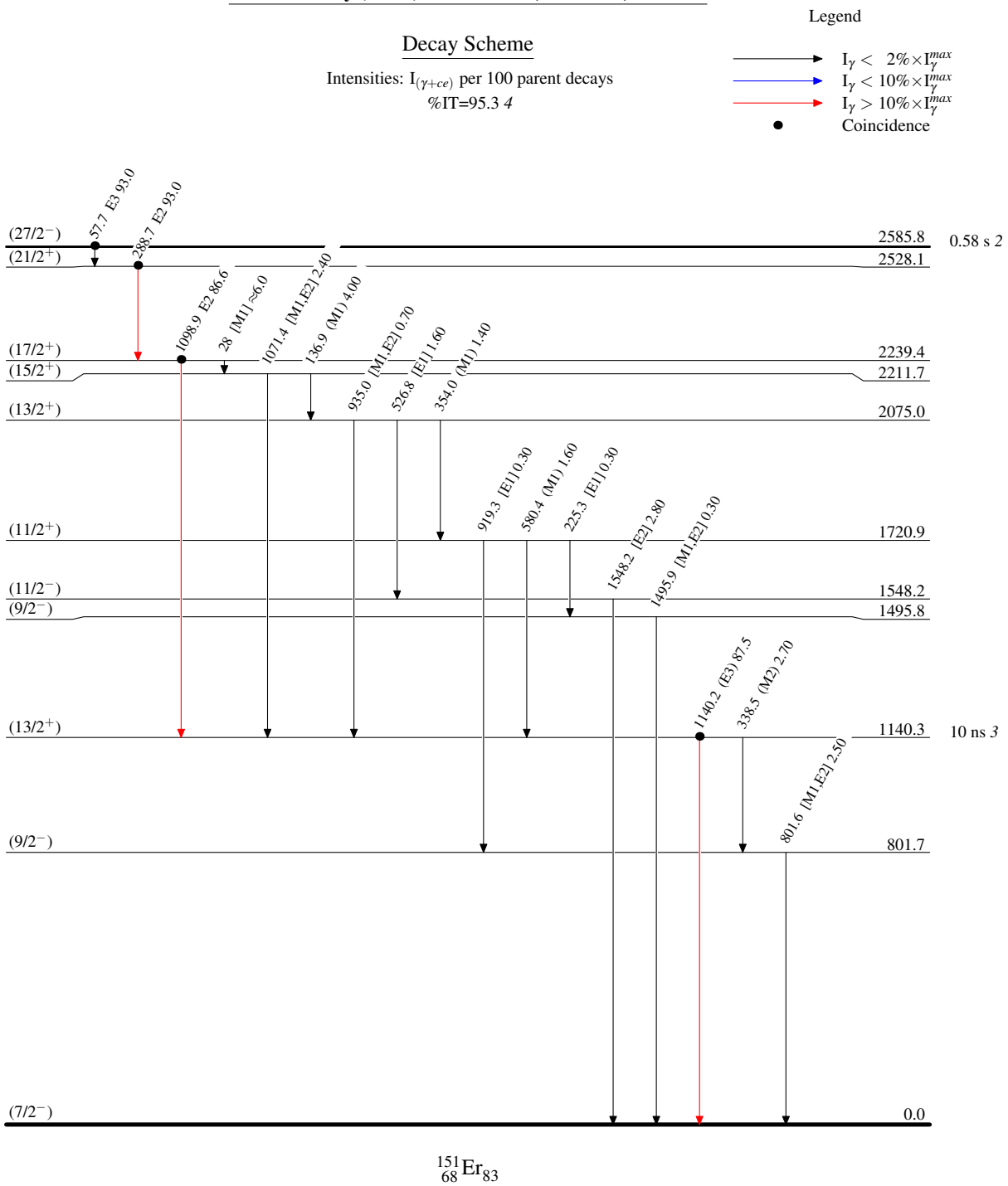
Decay Scheme

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

%IT=95.3 *4*



$^{151}_{68}Er_{83}$