^{151}Er IT decay (0.42 μs) 2000Fo15,1990An25

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

Parent: ^{151}Er: E=10286.0 *10*; J^π=(67/2$^-$); $T_{1/2}$=0.42 μs *5*; %IT decay=100.0

^{151}Er-$T_{1/2}$: recoil-shadow method with a pulsed (^{40}Ca) beam (1990An25).

2000Fo15 (also 2000Pa51): ^{116}Sn(^{40}Ca,2p3nγ) E=220 MeV. Measured Eγ, ce and γ-ce coin from a high-spin isomer.

1990An25: ^{116}Sn(^{40}Ca,2p3nγ) E=250 MeV. ^{144}Sm(^{12}C,5nγ) E=90-110 MeV and ^{115}In(^{40}Ca,p3nγ) reactions. Measured γ, $\gamma\gamma$, isomer $T_{1/2}$, $\gamma(\theta)$. The details of this study are not available.

Other: 1987McZZ (also 1987DaZS): ^{93}Nb(^{60}Ni,npγ) E=240 MeV. Measured γ, $\gamma\gamma$. Isomer $T_{1/2}$ deduced.

The two papers (2000Fo15 and 1990An25) are from the same experimental group, thus spin assignments from 2000Fo15 are adopted here.

Additional information 1.

^{151}Er Levels

E(level)‡	J^π†	$T_{1/2}$	Comments
0.0	(7/2$^-$)		Configuration=$\nu f_{7/2}$ (1997Co24).
801.6 *3*	(9/2$^-$)		Configuration=$\nu h_{9/2}$ (1997Co24).
1140.2 *3*	(13/2$^+$)		Configuration=$(\nu f_{7/2}\otimes 3^-)\otimes\nu i_{13/2}$ (1997Co24).
2239.1 *4*	(17/2$^+$)		Configuration=$\nu f_{7/2}\otimes 5^-$ (1997Co24).
2527.8 *5*	(21/2$^+$)		Configuration=$\nu f_{7/2}\otimes 7^-$ (1997Co24).
2585.5 *6*	(27/2$^-$)		Configuration=$\pi h^2_{11/2}\otimes\nu f_{7/2}$ (1997Co24).
3685.4 *7*	(31/2$^-$)		Additional information 2.
3901.0 *8*	(33/2$^-$)		Additional information 3.
4189.2 *8*			
4454.6 *8*	(37/2$^-$)		Additional information 4.
4617.5 *8*	(39/2$^-$)		Additional information 5. Probable configuration=$\pi[h^4_{11/2}]_{16+}\otimes\nu f_{7/2}$ (2000Fo15).
4751.6 *9*	(41/2$^-$)		Additional information 6.
5129.6 *9*	(43/2$^+$)		Additional information 7.
5803.8 *9*			
6131.3 *9*	(45/2$^+$)		Additional information 8.
6547.4 *10*	(47/2$^-$)		Additional information 9.
6663.7 *10*	(49/2$^-$)		Additional information 10.
6771.3 *10*			
7440.7 *10*	(53/2$^-$)		Additional information 11.
8015.4 *10*	(55/2$^+$)		Additional information 12.
8379.7 *10*	(57/2$^+$)		Additional information 13.
9045.6 *10*			
9391.4 *10*	(61/2$^+$)		Additional information 14.
10286.0 *10*	(67/2$^-$)	0.42 μs *5*	$T_{1/2}$: recoil-shadow method with a pulsed (^{40}Ca) beam (1990An25). Possible configuration=$\pi[h^4_{11/2}d^1_{3/2}d^{-1}_{5/2}]_{20+}\otimes\nu[f_{7/2}h_{9/2}h^{-1}_{11/2}]_{27/2-}$ (2000Fo15).

† From shell-model considerations and analogy to neighboring nuclides such as ^{149}Dy. For levels above 3600, the assignments are from 2000Fo15 with the parentheses added by the evaluator. Below this energy the assignments are from 'Adopted Levels'.

‡ From least-squares fit to Eγ's, assuming 0.3 keV uncertainty on Eγ's.

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$\gamma(^{151}Er)$

The α(K)exp/α(L)exp ratios, α(K)exp and α(L)exp are estimated values; read (by the evaluator) from figures 2, 3 and 4, respectively, of 2000Fo15. numerical data tables were not given by the authors.

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[a]	Comments
57.7	2585.5	(27/2⁻)	2527.8	(21/2⁺)	E3		Mult.: From 'Adopted Gammas'.
107.5	6771.3		6663.7	(49/2⁻)			
116.3	6663.7	(49/2⁻)	6547.4	(47/2⁻)	M1[#]	1.85	α(K)=1.550 *22*; α(L)=0.232 *4*; α(M)=0.0515 *8*; α(N+..)=0.01384 *20* α(N)=0.01200 *17*; α(O)=0.001735 *25*; α(P)=9.56×10^{-5} *14* α(L)exp=0.25 *5*.
134.1	4751.6	(41/2⁻)	4617.5	(39/2⁻)	M1[#]	1.232	α(K)=1.034 *15*; α(L)=0.1545 *22*; α(M)=0.0343 *5*; α(N+..)=0.00921 *13* α(N)=0.00799 *12*; α(O)=0.001156 *17*; α(P)=6.37×10^{-5} *9* α(K)exp=1.0 *3*, α(L)exp=0.13 *5*, εK(exp)/α(L)exp=7.5 *25*.
162.9	4617.5	(39/2⁻)	4454.6	(37/2⁻)	M1[#]	0.712	α(K)=0.598 *9*; α(L)=0.0891 *13*; α(M)=0.0198 *3*; α(N+..)=0.00531 *8* α(N)=0.00461 *7*; α(O)=0.000666 *10*; α(P)=3.68×10^{-5} *6* α(K)exp=0.7 *3*, α(L)exp=0.10 *4*, εK(exp)/α(L)exp=6.5 *15*.
215.6	3901.0	(33/2⁻)	3685.4	(31/2⁻)	M1[#]	0.327	α(K)=0.275 *4*; α(L)=0.0407 *6*; α(M)=0.00903 *13*; α(N+..)=0.00243 *4* α(N)=0.00211 *3*; α(O)=0.000305 *5*; α(P)=1.685×10^{-5} *24* α(K)exp=0.28 *6*, εK(exp)/α(L)exp=6.5 *15*.
288.3	4189.2		3901.0	(33/2⁻)			
288.7	2527.8	(21/2⁺)	2239.1	(17/2⁺)	E2	0.0776	α(K)=0.0563 *8*; α(L)=0.01646 *23*; α(M)=0.00386 *6*; α(N+..)=0.000998 *14* α(N)=0.000882 *13*; α(O)=0.0001129 *16*; α(P)=2.88×10^{-6} *4* εK(exp)/α(L)exp=3.3 *3*.
327.4	6131.3	(45/2⁺)	5803.8				
338.5[&]	1140.2	(13/2⁺)	801.6	(9/2⁻)	(M2)	0.372	α(K)=0.301 *5*; α(L)=0.0555 *8*; α(M)=0.01266 *18*; α(N+..)=0.00341 *5* α(N)=0.00296 *5*; α(O)=0.000423 *6*; α(P)=2.20×10^{-5} *3* Mult.: From 'Adopted Gammas'.
345.8	9391.4	(61/2⁺)	9045.6				
364.3	8379.7	(57/2⁺)	8015.4	(55/2⁺)	M1	0.0796	α(K)=0.0670 *10*; α(L)=0.00979 *14*; α(M)=0.00217 *3*; α(N+..)=0.000583 *9* α(N)=0.000505 *7*; α(O)=7.32×10^{-5} *11*; α(P)=4.08×10^{-6} *6* α(K)exp=0.056 *7*, εK(exp)/α(L)exp=6.5 *10*. Mult.: ΔJ=2, quadrupole from $\gamma(\theta)$ (1990An25) is inconsistent with M1 from ce data in 2000Fo15.
378.1	5129.6	(43/2⁺)	4751.6	(41/2⁻)	E1[#]	0.01059	α(K)=0.00896 *13*; α(L)=0.001275 *18*; α(M)=0.000281 *4*; α(N+..)=7.47×10^{-5} *11* α(N)=6.50×10^{-5} *10*; α(O)=9.20×10^{-6} *13*; α(P)=4.71×10^{-7} *7* α(K)exp=0.014 *6*.
416.1	6547.4	(47/2⁻)	6131.3	(45/2⁺)	E1	0.00847	α(K)=0.00717 *10*; α(L)=0.001014 *15*; α(M)=0.000223 *4*; α(N+..)=5.94×10^{-5} *9* α(N)=5.17×10^{-5} *8*; α(O)=7.34×10^{-6} *11*; α(P)=3.80×10^{-7} *6* α(K)exp=0.008 *4*.
428.3	4617.5	(39/2⁻)	4189.2				
532.5	6663.7	(49/2⁻)	6131.3	(45/2⁺)			
553.6	4454.6	(37/2⁻)	3901.0	(33/2⁻)	E2[@]	0.01271	α(K)=0.01023 *15*; α(L)=0.00193 *3*; α(M)=0.000438 *7*; α(N+..)=0.0001156 *17* α(N)=0.0001012 *15*; α(O)=1.382×10^{-5} *20*; α(P)=5.71×10^{-7}

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^{151}Er IT decay (0.42 μs) 2000Fo15,1990An25 (continued)

$\gamma(^{151}Er)$ (continued)

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[a]	Comments
							8 α(K)exp=0.009 *3*.
574.7	8015.4	(55/2$^+$)	7440.7	(53/2$^-$)	E1	0.00413	α(K)=0.00350 *5*; α(L)=0.000486 *7*; α(M)=0.0001069 *15*; α(N+..)=2.85×10^{-5} *4* α(N)=2.48×10^{-5} *4*; α(O)=3.54×10^{-6} *5*; α(P)=1.89×10^{-7} *3* α(K)exp=0.0045 *20*. Mult.: ΔJ=2 is favored over ΔJ=1, dipole from $\gamma(\theta)$ data (1990An25); but α(K)exp gives E1.
665.9	9045.6		8379.7	(57/2$^+$)			
674.3	5803.8		5129.6	(43/2$^+$)			
777.0	7440.7	(53/2$^-$)	6663.7	(49/2$^-$)	E2[@]	0.00575	α(K)=0.00475 *7*; α(L)=0.000780 *11*; α(M)=0.0001750 *25*; α(N+..)=4.65×10^{-5} *7* α(N)=4.05×10^{-5} *6*; α(O)=5.67×10^{-6} *8*; α(P)=2.69×10^{-7} *4* α(K)exp=0.006 *3*.
801.6[&]	801.6	(9/2$^-$)	0.0	(7/2$^-$)			
894.6	10286.0	(67/2$^-$)	9391.4	(61/2$^+$)	(E3)	0.00957	α(K)=0.00761 *11*; α(L)=0.001520 *22*; α(M)=0.000348 *5*; α(N+..)=9.21×10^{-5} *13* α(N)=8.05×10^{-5} *12*; α(O)=1.107×10^{-5} *16*; α(P)=4.66×10^{-7} *7* Mult.: α(K)exp=0.0077 *30* gives E3 or M1, but E3 is more likely if the 420-ns isomer decays through the 894.6γ.
1001.8	6131.3	(45/2$^+$)	5129.6	(43/2$^+$)	M1[#]	0.00614	α(K)=0.00520 *8*; α(L)=0.000734 *11*; α(M)=0.0001618 *23*; α(N+..)=4.35×10^{-5} *6* α(N)=3.77×10^{-5} *6*; α(O)=5.49×10^{-6} *8*; α(P)=3.10×10^{-7} *5* α(K)exp=0.0055 *30*.
1011.7	9391.4	(61/2$^+$)	8379.7	(57/2$^+$)	E2	0.00328	α(K)=0.00274 *4*; α(L)=0.000419 *6*; α(M)=9.32×10^{-5} *13*; α(N+..)=2.49×10^{-5} *4* α(N)=2.16×10^{-5} *3*; α(O)=3.07×10^{-6} *5*; α(P)=1.563×10^{-7} *22* α(K)exp=0.0025 *15*.
1052.0	5803.8		4751.6	(41/2$^-$)			
1098.9	2239.1	(17/2$^+$)	1140.2	(13/2$^+$)	E2	0.00277	α(K)=0.00233 *4*; α(L)=0.000349 *5*; α(M)=7.74×10^{-5} *11*; α(N+..)=2.07×10^{-5} *3* α(N)=1.80×10^{-5} *3*; α(O)=2.56×10^{-6} *4*; α(P)=1.326×10^{-7} *19* α(K)exp=0.0025 *10* for doublet.
1099.9	3685.4	(31/2$^-$)	2585.5	(27/2$^-$)	E2	0.00277	α(K)=0.00232 *4*; α(L)=0.000348 *5*; α(M)=7.72×10^{-5} *11*; α(N+..)=2.06×10^{-5} *3* α(N)=1.79×10^{-5} *3*; α(O)=2.56×10^{-6} *4*; α(P)=1.324×10^{-7} *19* α(K)exp=0.0025 *10* for doublet. Mult.: ΔJ=1, dipole from $\gamma(\theta)$ (1990An25) is inconsistent with E2 from ce data in 2000Fo15.
1140.2	1140.2	(13/2$^+$)	0.0	(7/2$^-$)	E3	0.00539	α(K)=0.00440 *7*; α(L)=0.000771 *11*; α(M)=0.0001742 *25*; α(N+..)=4.66×10^{-5} *7* α(N)=4.04×10^{-5} *6*; α(O)=5.67×10^{-6} *8*; α(P)=2.66×10^{-7} *4*; α(IPF)=2.46×10^{-7} *4* α(K)exp=0.005 *1*.
1244.1	8015.4	(55/2$^+$)	6771.3				

[†] From 2000Fo15 unless otherwise stated.

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^{151}Er IT decay (0.42 μs) 2000Fo15,1990An25 (continued)

γ(^{151}Er) (continued)

‡ From ce data of 2000Fo15, measured K/L ratios, α(K)exp and α(L)exp.
\# ΔJ=1, dipole transition from $\gamma(\theta)$ (1990An25) is consistent with M1 or E1 from ce data of 2000Fo15.
@ ΔJ=2, quadrupole transition from $\gamma(\theta)$ (1990An25) is consistent with E2 from ce data of 2000Fo15.
& Taken by 1990An25 from 1988Ba02.
[a] 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.

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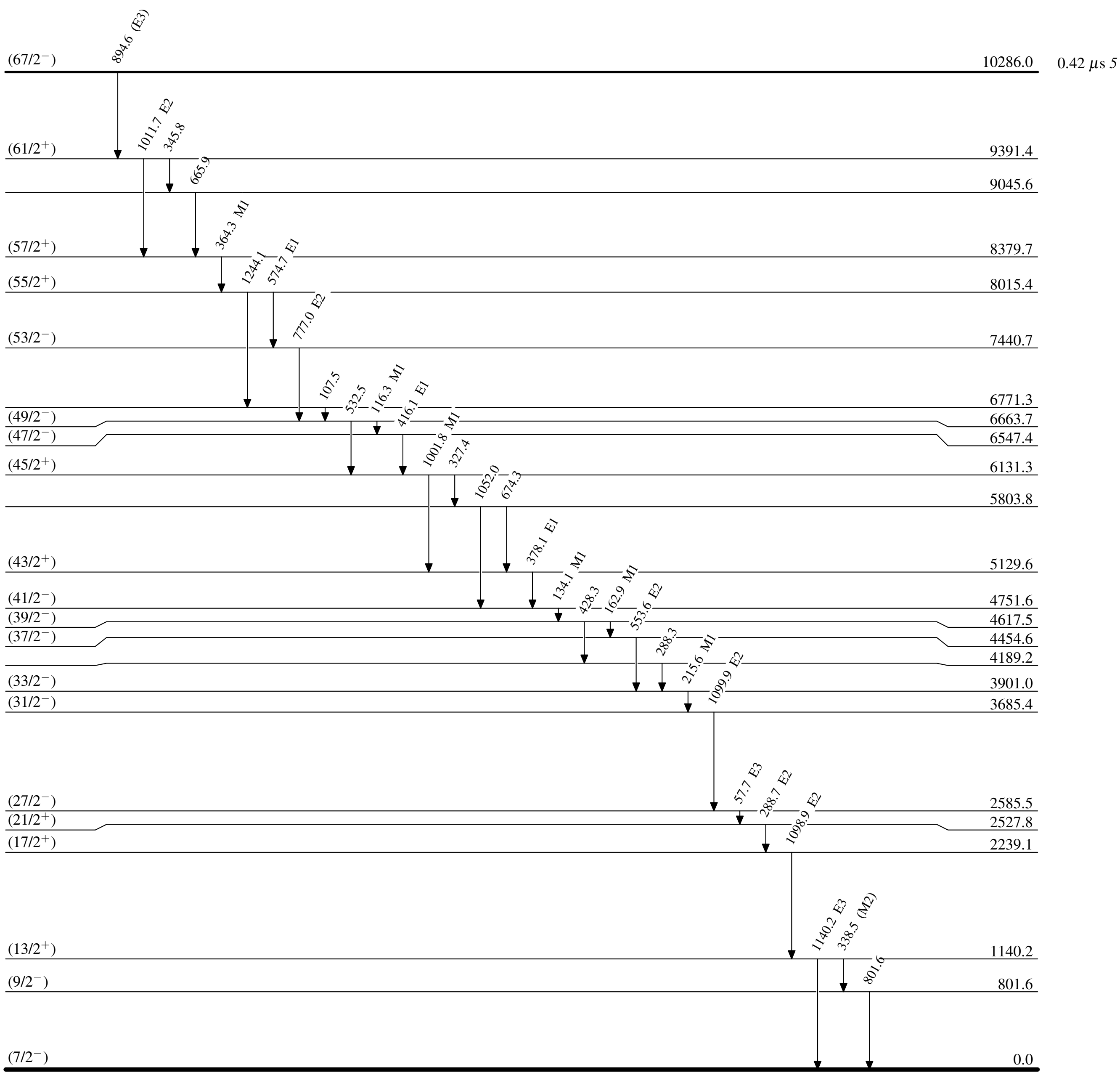
Decay Scheme

%IT=100.0



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