^{170}Er(^{136}Xe,Xγ) 2010Dr02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	08-Dec-2015

2010Dr02 (also 2006Dr04): E(^{136}Xe)=830 MeV, ns-pulsed beam with 856 ns pulse separation or macroscopically chopped beam with beam-on/ beam-off conditions ranging from the μs to the s regimes for out-of-beam data collection Au-backed isotopically-enriched metallic ^{170}Er target. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma\gamma$ coin, γ-γ-t, $T_{1/2}$ using GAMMASPHERE array at ATLAS-ANL facility. Various timing conditions used to identify isomers and isolate specific structures using γ-γ-t correlations. Deduced high-spin levels, J, π, g_K-g_R. Multi-quasiparticle calculations. No very long-lived isomers were identified.
Note that the authors report a partial level scheme only.

^{172}Er Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0[@]	0$^+$		
77.0[@] 2	2$^+$		
255.2[@] 3	4$^+$		
530.2[@] 3	6$^+$		
897.9[@] 4	8$^+$		
1034.4[&] 3	(3$^+$)		
1131.3[&] 3	(4$^+$)		
1251.5[&] 3	(5$^+$)		
1263.5[a] 3	(4$^-$)	39.5 ns 21	
1351.7[@] 4	10$^+$		
1367.3[a] 3	(5$^-$)		
1491.3[a] 3	(6$^-$)		
1500.9[b] 3	(6$^+$)	0.57 μs 6	$T_{1/2}$: other:>1 μs (2006Dr04).
1635.1[a] 3	(7$^-$)		
1654.3[b] 3	(7$^+$)		
1792.4[c] 3	(7$^-$)		
1799.0[a] 4	(8$^-$)		
1828.5[b] 3	(8$^+$)		
1885.3[@] 5	12$^+$		
1945.0[c] 4	(8$^-$)		
1981.0[a] 4	(9$^-$)		
2022.1[b] 4	(9$^+$)		
2110.8[c] 4	(9$^-$)		
2294.5[c] 4	(10$^-$)		
2498.6[c] 5	(11$^-$)		

[†] From least-squares fit to Eγ values.
[‡] As proposed by 2010Dr02, based on deduced band properties and comparison with isotone ^{174}Yb.
[#] From fits to time spectra produced by gating on transitions above and below level (2010Dr02).
[@] Band(A): K$^\pi$=0$^+$ g.s. band.
[&] Band(B): K$^\pi$=2$^+$ γ vibration band.
[a] Band(C): K$^\pi$=(4$^-$) band. Dominant configuration=π7/2[523]+π1/2[411]; supported by experimental band properties and expectations from multi-quasiparticle calculations.
[b] Band(D): K$^\pi$=(6$^+$) band. Possible configuration=ν5/2[512]+ν7/2[514]. Magnitude of g_K-g_R is similar to that for corresponding band in the ^{174}Yb isotone, but larger than expected for the suggested configuration.

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^{172}Er Levels (continued)

[c] Band(E): $K^\pi=(7^-)$ band. Probable configuration=$\nu 7/2[633]+\nu 7/2[514]$; supported by experimental branching ratios. The magnitude of g_K-g_R and the band structure are similar to those for the corresponding band in the ^{174}Yb isotone.

$\gamma(^{172}Er)$

E_i(level)	J_i^π	E_γ[†]	I_γ	E_f	J_f^π	Mult.	α[‡]	Comments
77.0	2^+	77.0 *2*		0.0	0^+			
255.2	4^+	178.1 *2*		77.0	2^+			
530.2	6^+	275.0 *2*		255.2	4^+			
897.9	8^+	367.7 *2*		530.2	6^+			
1034.4	(3^+)	779.3 *2*		255.2	4^+			
		957.3 *2*		77.0	2^+			
1131.3	(4^+)	876.1 *2*		255.2	4^+			
		1054.5 *2*		77.0	2^+			
1251.5	(5^+)	721.6 *2*		530.2	6^+			
		996.3 *2*		255.2	4^+			
1263.5	(4^-)	229.1 *2*	40 *3*	1034.4	(3^+)	[E1]	0.0366	α(K)=0.0308 *5*; α(L)=0.00452 *7*; α(M)=0.000998 *15* α(N)=0.000230 *4*; α(O)=3.21×10^{-5} *5*; α(P)=1.548×10^{-6} *22*
		1008.3 *2*	100 *3*	255.2	4^+	[E1]	1.35×10^{-3}	α(K)=0.001149 *16*; α(L)=0.0001550 *22*; α(M)=3.39×10^{-5} *5* α(N)=7.89×10^{-6} *11*; α(O)=1.138×10^{-6} *16*; α(P)=6.30×10^{-8} *9*
1351.7	10^+	453.8 *2*		897.9	8^+			
1367.3	(5^-)	103.8 *2*		1263.5	(4^-)			
		1112.0 *2*		255.2	4^+			
1491.3	(6^-)	124.1 *2*	100	1367.3	(5^-)			
		228.0 *2*	30 *3*	1263.5	(4^-)			I_γ: from table III.
1500.9	(6^+)	133.6 *2*	100 *3*	1367.3	(5^-)	E1	0.1507	α(exp)=0.26 *3* α(K)=0.1259 *19*; α(L)=0.0194 *3*; α(M)=0.00428 *7* α(N)=0.000983 *15*; α(O)=0.0001338 *20*; α(P)=5.91×10^{-6} *9* Mult.: α(exp)=0.26 *3* from delayed intensity balance. This implies δ(M2/E1)=0.11 *+4−2*, higher than expected for the two-orbital change required by the proposed initial and final state configurations. Alternatively, α(exp) may be high due to a possible issue with systematic uncertainties in the efficiency calibration.
		249.6 *2*	11.3 *8*	1251.5	(5^+)	[M1]	0.219	α(K)=0.184 *3*; α(L)=0.0272 *4*; α(M)=0.00603 *9* α(N)=0.001406 *20*; α(O)=0.000204 *3*; α(P)=1.127×10^{-5} *16*
		369.7 *2*	12.1 *8*	1131.3	(4^+)	[E2]	0.0373	α(K)=0.0285 *4*; α(L)=0.00684 *10*; α(M)=0.001583 *23* α(N)=0.000364 *6*; α(O)=4.77×10^{-5} *7*; α(P)=1.520×10^{-6} *22*
		970.5 *2*	6.2 *8*	530.2	6^+	[M1]	0.00663	α(K)=0.00562 *8*; α(L)=0.000794 *12*; α(M)=0.0001750 *25* α(N)=4.08×10^{-5} *6*; α(O)=5.93×10^{-6} *9*; α(P)=3.35×10^{-7} *5*
1635.1	(7^-)	143.8 *2*	100	1491.3	(6^-)			
		267.6 *2*	47 *5*	1367.3	(5^-)			I_γ: from table III.

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

E_i(level)	J_i^π	E_γ [†]	I_γ	E_f	J_f^π	Comments
1654.3	(7^+)	153.3 *2*		1500.9	(6^+)	
1792.4	(7^-)	138.1 *2*		1654.3	(7^+)	
		291.4 *2*		1500.9	(6^+)	
1799.0	(8^-)	163.8 *2*	100	1635.1	(7^-)	
		307.7 *2*	92 *9*	1491.3	(6^-)	I_γ: from table III.
1828.5	(8^+)	174.0 *2*	100	1654.3	(7^+)	
		327.7 *2*	32 *7*	1500.9	(6^+)	I_γ: from table IV.
1885.3	12^+	533.6 *2*		1351.7	10^+	
1945.0	(8^-)	152.6 *2*		1792.4	(7^-)	
1981.0	(9^-)	182 *1*		1799.0	(8^-)	
		345.9 *2*		1635.1	(7^-)	
2022.1	(9^+)	193.6 *2*		1828.5	(8^+)	
		368 *1*		1654.3	(7^+)	
2110.8	(9^-)	165.5 *2*	100	1945.0	(8^-)	
		318.4 *2*	48 *7*	1792.4	(7^-)	I_γ: from table IV.
2294.5	(10^-)	183.6 *2*		2110.8	(9^-)	
		349.7 *2*		1945.0	(8^-)	
2498.6	(11^-)	204.0 *2*		2294.5	(10^-)	
		388 *1*		2110.8	(9^-)	

[†] Uncertainty unstated by authors in 2010Dr02 but reported to be 0.2 keV via an email to C.M. Baglin from G. Dracoulis (May 2010). However, 1 keV uncertainty assigned here to Eγ values quoted to the nearest keV.

[‡] From BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" appr. When no δ value given, value overlaps listed multipolarities.

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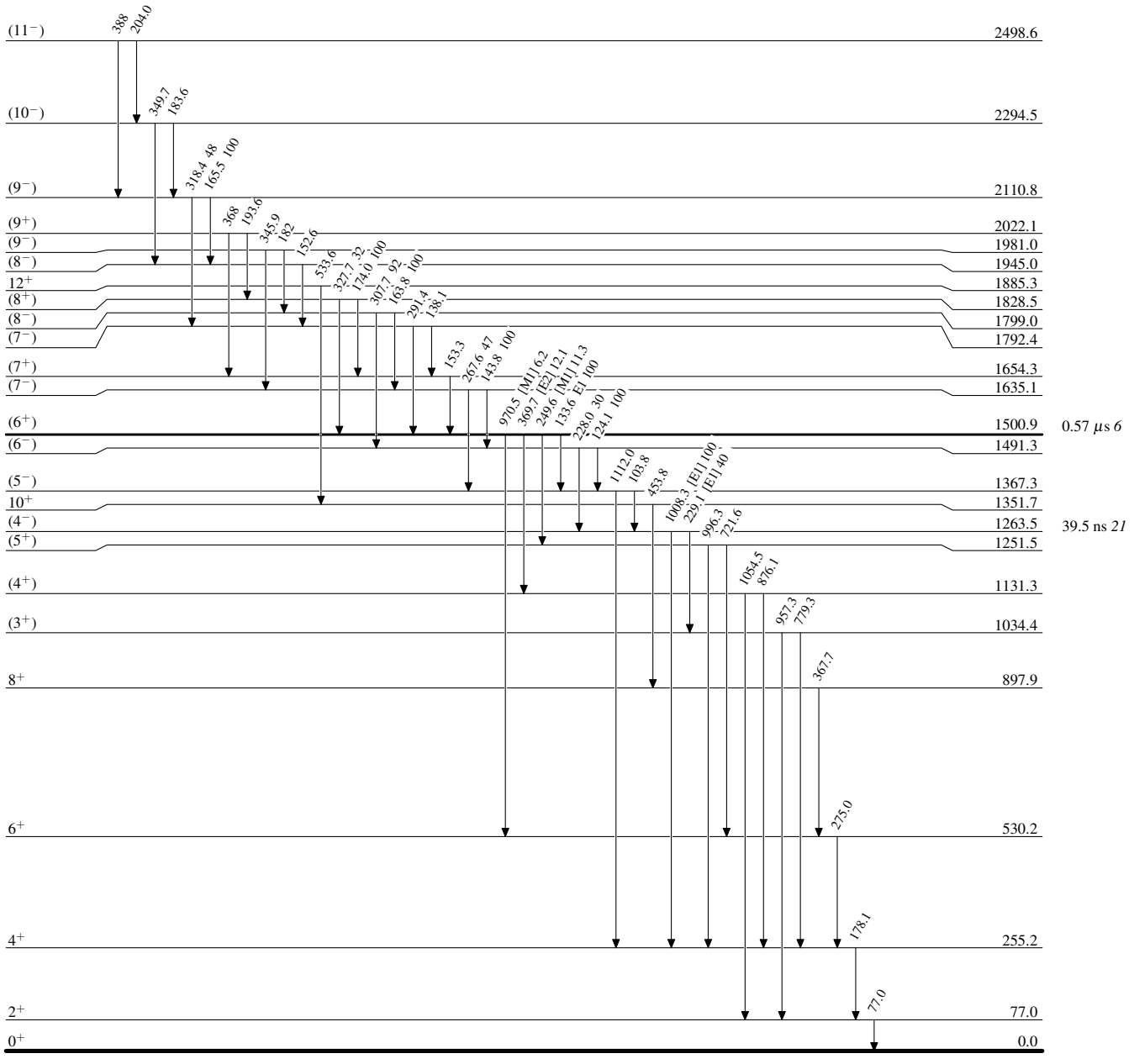
Level Scheme

Intensities: Relative photon branching from each level



$^{172}_{68}Er_{104}$

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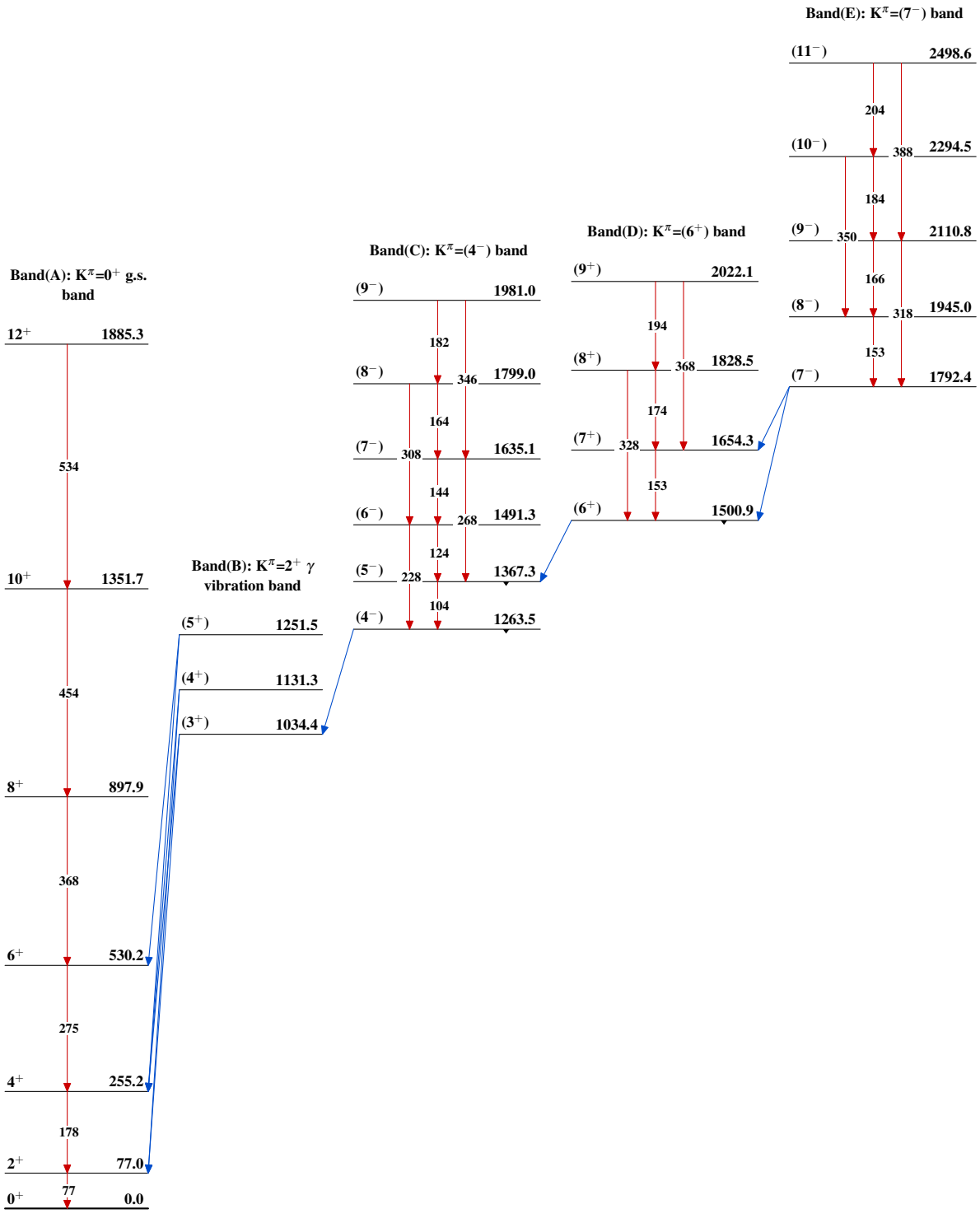

$^{172}_{68}Er_{104}$