^{170}Er(^{136}Xe,Xγ) 2010Dr02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. M. Baglin[1], E. A. Mccutchan[2], S. Basunia[1]	NDS 153, 1 (2018)	1-Oct-2018

E(^{136}Xe)=830 MeV; Au-backed isotopically-enriched metallic ^{170}Er target; GAMMASPHERE detector array; 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; measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma\gamma$ coin, γ-γ-t, $T_{1/2}$; various timing conditions used to identify isomers and isolate specific structures using γ-γ-t correlations; deduced g_K-g_R. Multi-quasiparticle calculations. No very long-lived isomers were identified.

Note that the authors report a partial level scheme only.

^{170}Er Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0[#]	0^+		
78.62[#] *16*	2^+		
260.27[#] *17*	4^+		
540.59[#] *21*	6^+		
914.92[#] *25*	8^+		
934.08[@] *16*	2^+		
1010.69[@] *20*	(3^+)		
1103.43 *20*	4^+		
1127.33[@] *18*	4^+		
1217.57 *18*	$3^{(+)}$		
1268.78[&] *18*	(4^-)	43.7 ns *14*	$T_{1/2}$: from γ-γ-t spectrum.
1372.36[&] *22*	(5^-)		
1376.4[#] *4*	10^+		
1496.23[&] *22*	(6^-)		
1590.68[a] *25*	(6^-)	4.0 ns *10*	$T_{1/2}$: from fit to intermediate time spectrum constructed with gates on In-band transitions and either the 227γ or 218γ that are placed below the bandhead.
1639.25[&] *22*	(7^-)		
1715.9[a] *3*	(7^-)		
1803.64[&] *25*	(8^-)		
1861.0[a] *3*	(8^-)		
1943.2[b] *4*	(7)		possible K=7 intrinsic state.
1989.9[&] *3*	(9^-)		
2026.4[a] *3*	(9^-)		
2106.6[b] *4*	(8)		
2168.4 *3*	(7)		possible intrinsic state; may be the $K^\pi=7^-$ (π 7/2[404])+(π 7/2[523]) bandhead.
2187.8[&] *4*	(10^-)		
2211.9[a] *4*	(10^-)		
2289.6[b] *11*	(9)		
2407.8[a] *4*	(11)		
2431.7[c] *4*	(8)		possible intrinsic state; may be $K^\pi=8^-$ (ν 9/2[624])+(ν 7/2[512]) bandhead.
2603.1[c] *4*	(9)		
2655.9[&] *4*	(12^-)		
2794.1[c] *11*	(10)		

[†] From least-squares fit to Eγ.
[‡] Authors' suggested values.

Continued on next page (footnotes at end of table)

^{170}Er(^{136}Xe,Xγ) 2010Dr02 (continued)

^{170}Er Levels (continued)

[#] Band(A): $K^\pi=0^+$ g.s. band.
[@] Band(B): $K^\pi=2^+$ γ vibration band.
[&] Band(C): $K^\pi=(4^-)$ band. Mixed configuration: comparable contributions from (ν 7/2[633])+(ν 1/2[521]) and (π 7/2[523])+(π 1/2[411]); supported by experimental band properties and expectations from multi-quasiparticle calculations.
[a] Band(D): $K^\pi=(6^-)$ band. Possible configuration: (ν 7/2[633])+(ν 5/2[512]); consistent with observed alignment and In reasonable agreement with g_K-g_R. Transition energies are similar to those for the (6^-) band In ^{168}Er. A $K^\pi=7^-$ (ν 7/2[633])+(ν 7/2[514]) configuration, predicted At comparable excitation energy, is expected to have significantly smaller g_K-g_R. Note, however, that I(95γ)/I(218γ) and absence of a 322γ to the 4^- 1269 level differ from expectations for the $K^\pi=6^-$ bandhead option.
[b] Band(E): K=(7) band.
[c] Band(F): K=(8) band.

γ(^{170}Er)

E_i(level)	J_i^π	E_γ[†#]	I_γ[‡]	E_f	J_f^π	Mult.	α[@]	Comments
78.62	2^+	78.6 *2*		0.0	0^+			
260.27	4^+	181.6 *2*		78.62	2^+			
540.59	6^+	280.4 *2*		260.27	4^+			
914.92	8^+	374.3 *2*		540.59	6^+			
934.08	2^+	673.7 *2*		260.27	4^+			
		855.5 *2*		78.62	2^+			
		934.1 *2*		0.0	0^+			
1010.69	(3^+)	750.4 *2*		260.27	4^+			
		932.1 *2*		78.62	2^+			
1103.43	4^+	843.2 *2*		260.27	4^+			
		1024.7 *2*		78.62	2^+			
1127.33	4^+	193.2 *2*		934.08	2^+			
		586.7 *2*		540.59	6^+			
		867.2 *2*		260.27	4^+			
		1048.7 *2*		78.62	2^+			
1217.57	$3^{(+)}$	283.5 *2*		934.08	2^+			
		957.3 *2*		260.27	4^+			
		1139.0 *2*		78.62	2^+			
1268.78	(4^-)	51.3 *2*		1217.57	$3^{(+)}$	[E1]	0.355 *7*	
		141.5 *2*		1127.33	4^+	[E1]	0.1293	
		165.3 *2*		1103.43	4^+	[E1]	0.0857	
		258.1 *2*		1010.69	(3^+)	[E1]	0.0270	
		1008.3 *2*		260.27	4^+			
1372.36	(5^-)	103.5 *2*		1268.78	(4^-)			
		832 *1*		540.59	6^+			
		1112 *1*		260.27	4^+			
1376.4	10^+	461.5 *2*		914.92	8^+			
1496.23	(6^-)	123.9 *2*	90 *4*	1372.36	(5^-)			
		227.4 *2*	100	1268.78	(4^-)			
1590.68	(6^-)	94.5 *2*	100 *3*	1496.23	(6^-)	[M1]	3.35	
		218.3 *2*	51.1 *19*	1372.36	(5^-)	[M1]	0.316	
		(322)	<1.8	1268.78	(4^-)	[E2]	0.0558	
1639.25	(7^-)	142.9 *2*	45 *6*	1496.23	(6^-)			
		266.8 *2*	100	1372.36	(5^-)			
		724.3 *3*		914.92	8^+			E_γ: uncertainty taken from text of 2010Dr02.
		1098.8 *2*		540.59	6^+			
1715.9	(7^-)	125.5 *2*		1590.68	(6^-)			
1803.64	(8^-)	164.3 *2*	24 *3*	1639.25	(7^-)			
		307.5 *2*	100	1496.23	(6^-)			

Continued on next page (footnotes at end of table)

^{170}Er(^{136}Xe,Xγ) 2010Dr02 (continued)

$\gamma(^{170}Er)$ (continued)

E_i(level)	J_i^π	E_γ[†#]	I_γ[‡]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[†#]	I_γ[‡]	E_f	J_f^π
1861.0	(8$^-$)	145.1 *2*	100	1715.9	(7$^-$)	2187.8	(10$^-$)	384.2 *2*		1803.64	(8$^-$)
		270.4 *2*	15.9 *11*	1590.68	(6$^-$)	2211.9	(10$^-$)	185.5 *2*	100	2026.4	(9$^-$)
1943.2	(7)	352.5 *2*		1590.68	(6$^-$)			350.9 *2*	46 *5*	1861.0	(8$^-$)
1989.9	(9$^-$)	186.3 *2*		1803.64	(8$^-$)	2289.6	(9)	183 *1*		2106.6	(8)
		350.7 *2*		1639.25	(7$^-$)	2407.8	(11)	381.4 *2*		2026.4	(9$^-$)
2026.4	(9$^-$)	165.4 *2*	100	1861.0	(8$^-$)	2431.7	(8)	263.3 *2*		2168.4	(7)
		310.4 *2*	46 *3*	1715.9	(7$^-$)			716 *1*		1715.9	(7$^-$)
2106.6	(8)	163.4 *2*		1943.2	(7)	2603.1	(9)	171.4 *2*		2431.7	(8)
2168.4	(7)	452.7 *2*		1715.9	(7$^-$)	2655.9	(12$^-$)	468.1 *2*		2187.8	(10$^-$)
		577.4 *2*		1590.68	(6$^-$)	2794.1	(10)	191 *1*		2603.1	(9)
		672.1 *2*		1496.23	(6$^-$)						

† Uncertainty unstated by authors in 2010Dr02 but reported to be 0.2 keV via an email to the compiler from G. Dracoulis (May 2010). Agreement with values known from the literature is excellent. However, the evaluator has assigned 1 keV uncertainty to Eγ data that were quoted only to the nearest keV.

‡ Relative branching from each level.

Rounded value from level energy difference; transition expected but unobserved.

@ 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.

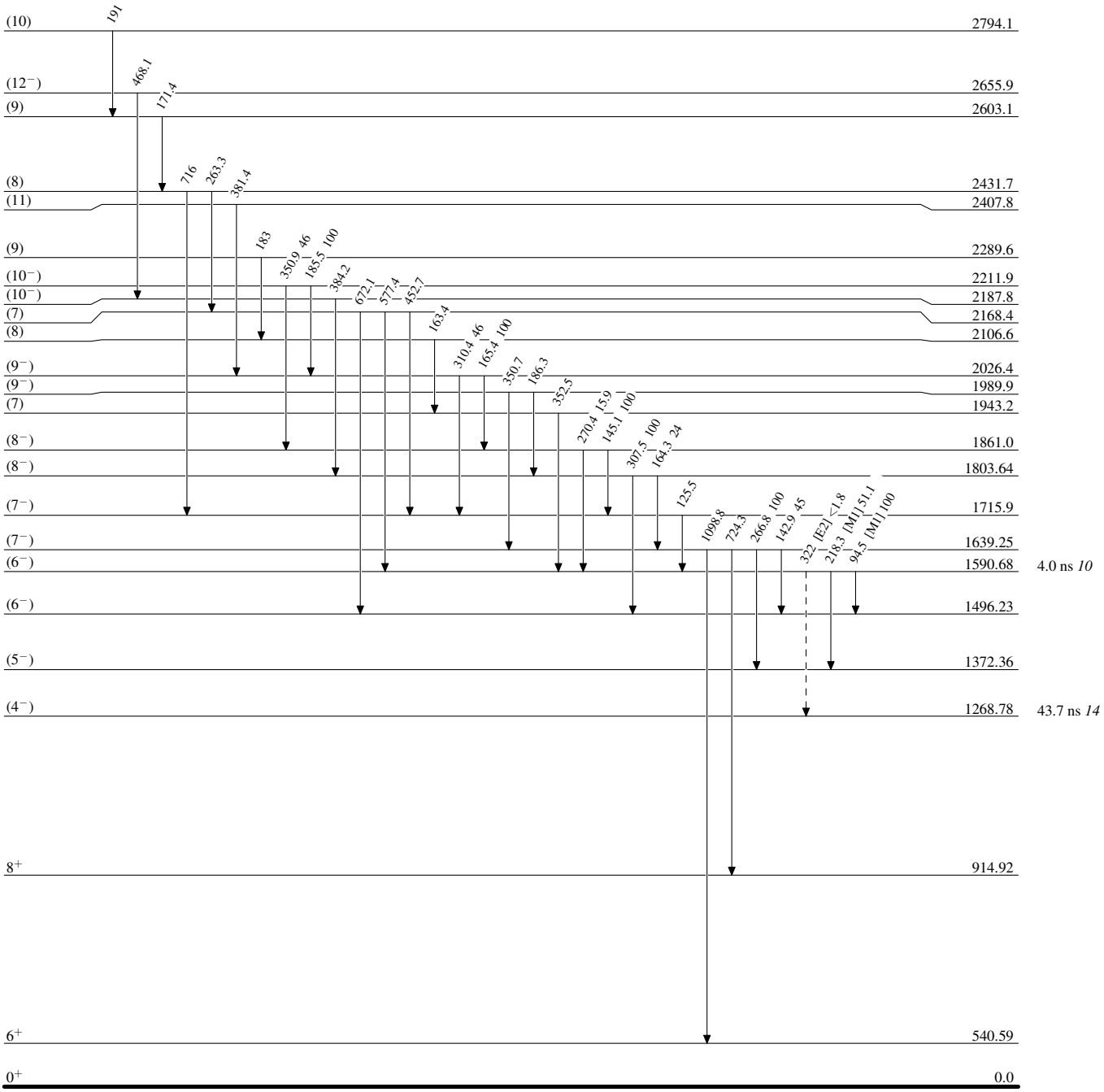
^{170}Er(^{136}Xe,Xγ) 2010Dr02

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

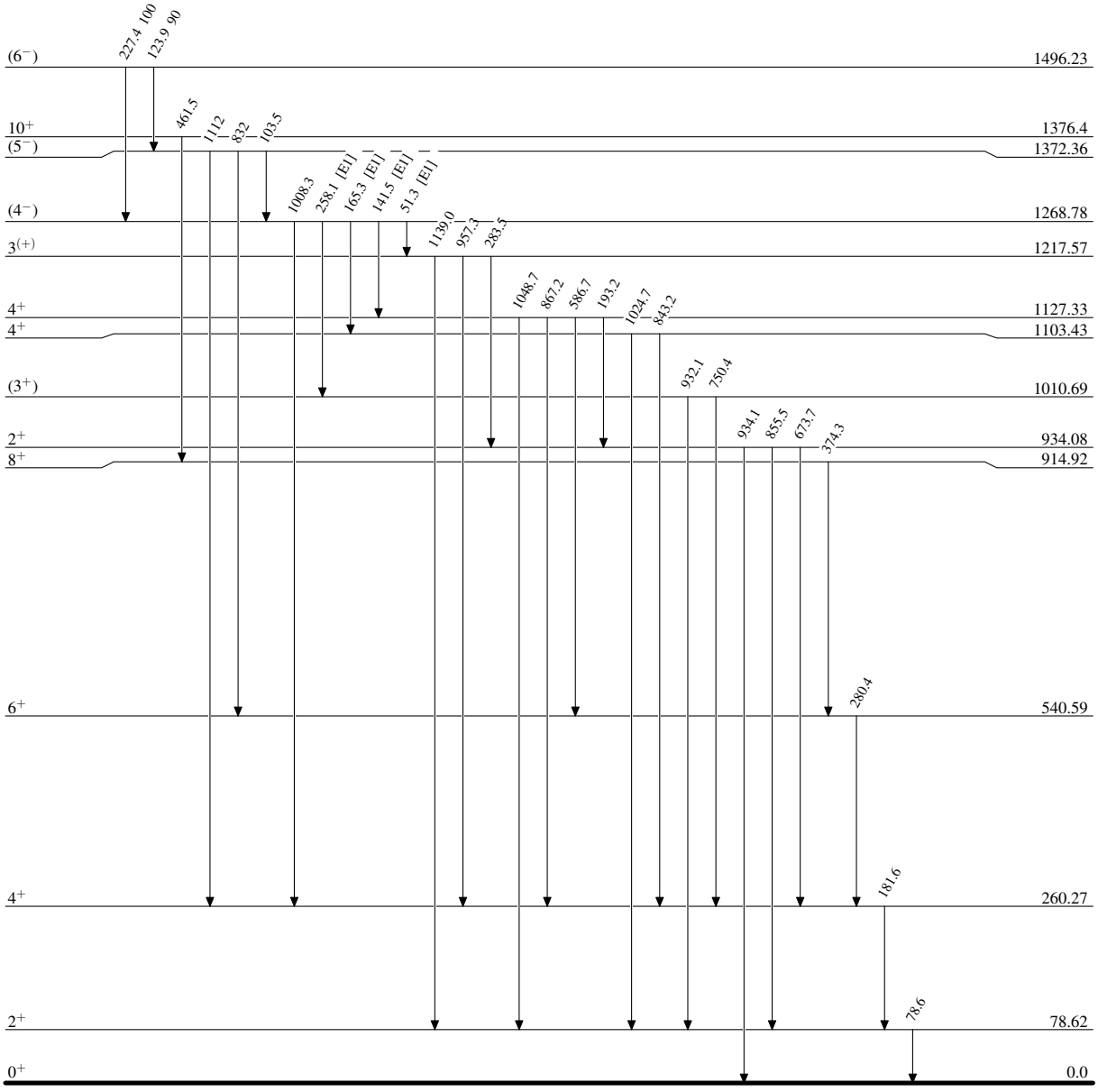


$^{170}_{68}Er_{102}$

^{170}Er(^{136}Xe,Xγ) 2010Dr02

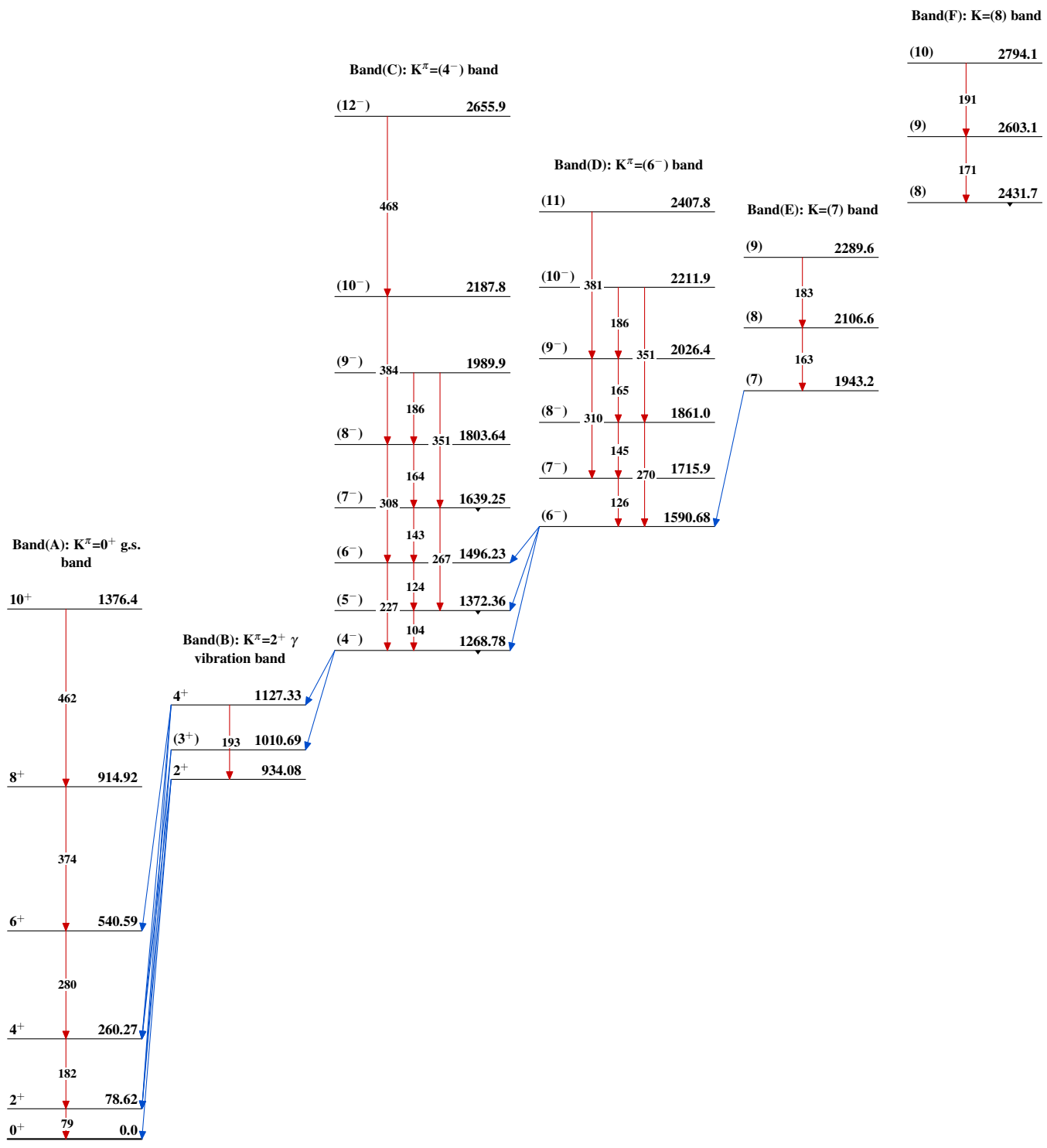
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{170}_{68}Er_{102}$

^{170}Er(^{136}Xe,Xγ) 2010Dr02



$^{170}_{68}Er_{102}$