^{160}Gd(^{11}B,α4nγ) 2004Ho19

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich, Balraj Singh	NDS 111, 1211 (2010)	12-Apr-2010

Additional information 1.

E(^{11}B)=61 MeV. Target consisted of a stack of three foils, each consisting of a 180 μg/cm^2 thickness of isotopically enriched $^{160}Gd_2O_3$ (enrichment not given) evaporated onto a 15 μg/cm^2 carbon foil. γ radiation studied using the GASP array, consisting of 40 Compton-suppressed large-volume Ge detectors and a multiplicity filter of 80 BGO detectors. Measured Eγ, Iγ, $\gamma\gamma$ coin.

^{163}Ho Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	E(level)[†]	J$^\pi$[‡]
0.0[b]	7/2$^-$		1767.6[c]	(21/2$^+$)
100.08[a]	9/2$^-$		1836.2[e]	(23/2$^+$)
222.14[b]	11/2$^-$		1900.6[f]	(25/2$^-$)
297.88[#e]	1/2$^+$[#]	1.09[#] s *3*	1924.7[d]	(23/2$^+$)
307.7[e]	3/2$^+$		1931.8[b]	(27/2$^-$)
366.5[a]	13/2$^-$		2098.7[c]	(25/2$^+$)
431.19[e]	7/2$^+$		2237.7[a]	(29/2$^-$)
500.5[f]	5/2$^-$		2289.0[d]	(27/2$^+$)
531.7[b]	(15/2$^-$)		2376.7[e]	(27/2$^+$)
612.9[f]	9/2$^-$		2416.1[f]	(29/2$^-$)
652.1[e]	(11/2$^+$)		2495.8[c]	(29/2$^+$)
719.3[a]	(17/2$^-$)		2528.0[b]	(31/2$^-$)
810.4[f]	(13/2$^-$)		2718.2[d]	(31/2$^+$)
924.3[b]	(19/2$^-$)		2858.5[a]	(33/2$^-$)
965.0[e]	(15/2$^+$)		2955.9[c]	(33/2$^+$)
1092.7[f]	(17/2$^-$)		2962.7[e]	(31/2$^+$)
1153.8[a]	(21/2$^-$)		2998.5[f]	(33/2$^-$)
1362.6[e]	(19/2$^+$)		3138.5[b]	(35/2$^-$)
1393.7[b]	(23/2$^-$)		3209.1[d]	(35/2$^+$)
1457.5[f]	(21/2$^-$)		3475.1?[c]	(37/2$^+$)
1505.1[c]	(17/2$^+$)[&]	$\geq$15[@] ns	3641.9[f]	(37/2$^-$)
1627.6[d]	(19/2$^+$)		4342.7[f]	(41/2$^-$)
1662.8[a]	(25/2$^-$)			

[†] Unless noted otherwise, from a least-squares fit to the listed Eγ values. The uncertainties assumed for this fit are As follows: 0.3 keV for Eγ values quoted to tenths of a keV; and 1 keV for the others. Although reasonable, based on the findings of similar experiments, these are somewhat arbitrary, and the evaluators have chosen not to list uncertainties for the level energies.

[‡] From the Adopted Values. 2004Ho19 extend the previously established one-quasiparticle bands to higher spins. They also report, for the first time, the listed three-quasiparticle bands. These new J$^\pi$ values are based largely on the usual considerations of rotational-band structure, unless noted otherwise.

[#] From the Adopted Levels.

[@] Lower limit, based on observation that, depending on the half-life, the recoil product can decay outside the detection system (2004Ho19).

[&] From the three-quasiparticle configuration assigned by 2004Ho19, based on the presumably similar situation In the isotone, ^{165}Tm.

[a] Band(A): π7/2[523], α=+1/2.

[b] Band(a): π7/2[523], α=−1/2.

Continued on next page (footnotes at end of table)

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^{163}Ho Levels (continued)

[c] Band(B): π7/2[523]⊗ν5/2[642]⊗ν5/2[523], $K^{\pi}=17/2^{+}$. $\alpha=+1/2$.
[d] Band(b): π7/2[523]⊗ν5/2[642]⊗ν5/2[523], $K^{\pi}=17/2^{+}$, $\alpha=-1/2$.
[e] Band(C): π1/2[411].
[f] Band(D): π1/2[541].

γ(^{163}Ho)

Authors list only Eγ values, and these only In their proposed level scheme.

E$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	E$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
100.1	100.08	9/2$^-$	0.0	7/2$^-$	309.6	531.7	(15/2$^-$)	222.14	11/2$^-$
112.4	612.9	9/2$^-$	500.5	5/2$^-$	312.8	965.0	(15/2$^+$)	652.1	(11/2$^+$)
122.1	222.14	11/2$^-$	100.08	9/2$^-$	330.6	2858.5	(33/2$^-$)	2528.0	(31/2$^-$)
122.2	1627.6	(19/2$^+$)	1505.1	(17/2$^+$)	331.2	431.19	7/2$^+$	100.08	9/2$^-$
123.5	431.19	7/2$^+$	307.7	3/2$^+$	331.2	2098.7	(25/2$^+$)	1767.6	(21/2$^+$)
127.4	1092.7	(17/2$^-$)	965.0	(15/2$^+$)	352.9	719.3	(17/2$^-$)	366.5	13/2$^-$
140.0	1767.6	(21/2$^+$)	1627.6	(19/2$^+$)	364.3	2289.0	(27/2$^+$)	1924.7	(23/2$^+$)
144.4	366.5	13/2$^-$	222.14	11/2$^-$	364.8	1457.5	(21/2$^-$)	1092.7	(17/2$^-$)
154.5	965.0	(15/2$^+$)	810.4	(13/2$^-$)	392.7	924.3	(19/2$^-$)	531.7	(15/2$^-$)
156.9	1924.7	(23/2$^+$)	1767.6	(21/2$^+$)	397.1	2495.8	(29/2$^+$)	2098.7	(25/2$^+$)
158.4	810.4	(13/2$^-$)	652.1	(11/2$^+$)	397.6	1362.6	(19/2$^+$)	965.0	(15/2$^+$)
165.2	531.7	(15/2$^-$)	366.5	13/2$^-$	429.4	2718.2	(31/2$^+$)	2289.0	(27/2$^+$)
173.9	2098.7	(25/2$^+$)	1924.7	(23/2$^+$)	431.1	431.19	7/2$^+$	0.0	7/2$^-$
181.7	612.9	9/2$^-$	431.19	7/2$^+$	434.6	1153.8	(21/2$^-$)	719.3	(17/2$^-$)
187.8	719.3	(17/2$^-$)	531.7	(15/2$^-$)	443.1	1900.6	(25/2$^-$)	1457.5	(21/2$^-$)
190.5	2289.0	(27/2$^+$)	2098.7	(25/2$^+$)	459.8	2955.9	(33/2$^+$)	2495.8	(29/2$^+$)
192.8	500.5	5/2$^-$	307.7	3/2$^+$	469.4	1393.7	(23/2$^-$)	924.3	(19/2$^-$)
197.5	810.4	(13/2$^-$)	612.9	9/2$^-$	473.6	1836.2	(23/2$^+$)	1362.6	(19/2$^+$)
204.9	924.3	(19/2$^-$)	719.3	(17/2$^-$)	491.2	3209.1	(35/2$^+$)	2718.2	(31/2$^+$)
206.6	2495.8	(29/2$^+$)	2289.0	(27/2$^+$)	509.2	1662.8	(25/2$^-$)	1153.8	(21/2$^-$)
220.9	652.1	(11/2$^+$)	431.19	7/2$^+$	515.5	2416.1	(29/2$^-$)	1900.6	(25/2$^-$)
222.2	222.14	11/2$^-$	0.0	7/2$^-$	519[†]	3475.1?	(37/2$^+$)	2955.9	(33/2$^+$)
222.4	2718.2	(31/2$^+$)	2495.8	(29/2$^+$)	537.9	1931.8	(27/2$^-$)	1393.7	(23/2$^-$)
229.6	1153.8	(21/2$^-$)	924.3	(19/2$^-$)	540.5	2376.7	(27/2$^+$)	1836.2	(23/2$^+$)
237.8	2955.9	(33/2$^+$)	2718.2	(31/2$^+$)	574.9	2237.7	(29/2$^-$)	1662.8	(25/2$^-$)
239.8	1393.7	(23/2$^-$)	1153.8	(21/2$^-$)	582.4	2998.5	(33/2$^-$)	2416.1	(29/2$^-$)
253.0	3209.1	(35/2$^+$)	2955.9	(33/2$^+$)	586	2962.7	(31/2$^+$)	2376.7	(27/2$^+$)
266.0[†]	3475.1?	(37/2$^+$)	3209.1	(35/2$^+$)	595.9	2528.0	(31/2$^-$)	1931.8	(27/2$^-$)
266.3	366.5	13/2$^-$	100.08	9/2$^-$	610.5	3138.5	(35/2$^-$)	2528.0	(31/2$^-$)
269.2	1662.8	(25/2$^-$)	1393.7	(23/2$^-$)	620.8	2858.5	(33/2$^-$)	2237.7	(29/2$^-$)
269.2	1931.8	(27/2$^-$)	1662.8	(25/2$^-$)	643.4	3641.9	(37/2$^-$)	2998.5	(33/2$^-$)
282.6	1092.7	(17/2$^-$)	810.4	(13/2$^-$)	700.8	4342.7	(41/2$^-$)	3641.9	(37/2$^-$)
290.6	2528.0	(31/2$^-$)	2237.7	(29/2$^-$)	771.2	1924.7	(23/2$^+$)	1153.8	(21/2$^-$)
296.8	1924.7	(23/2$^+$)	1627.6	(19/2$^+$)	973.1	1505.1	(17/2$^+$)	531.7	(15/2$^-$)
306.0	2237.7	(29/2$^-$)	1931.8	(27/2$^-$)					

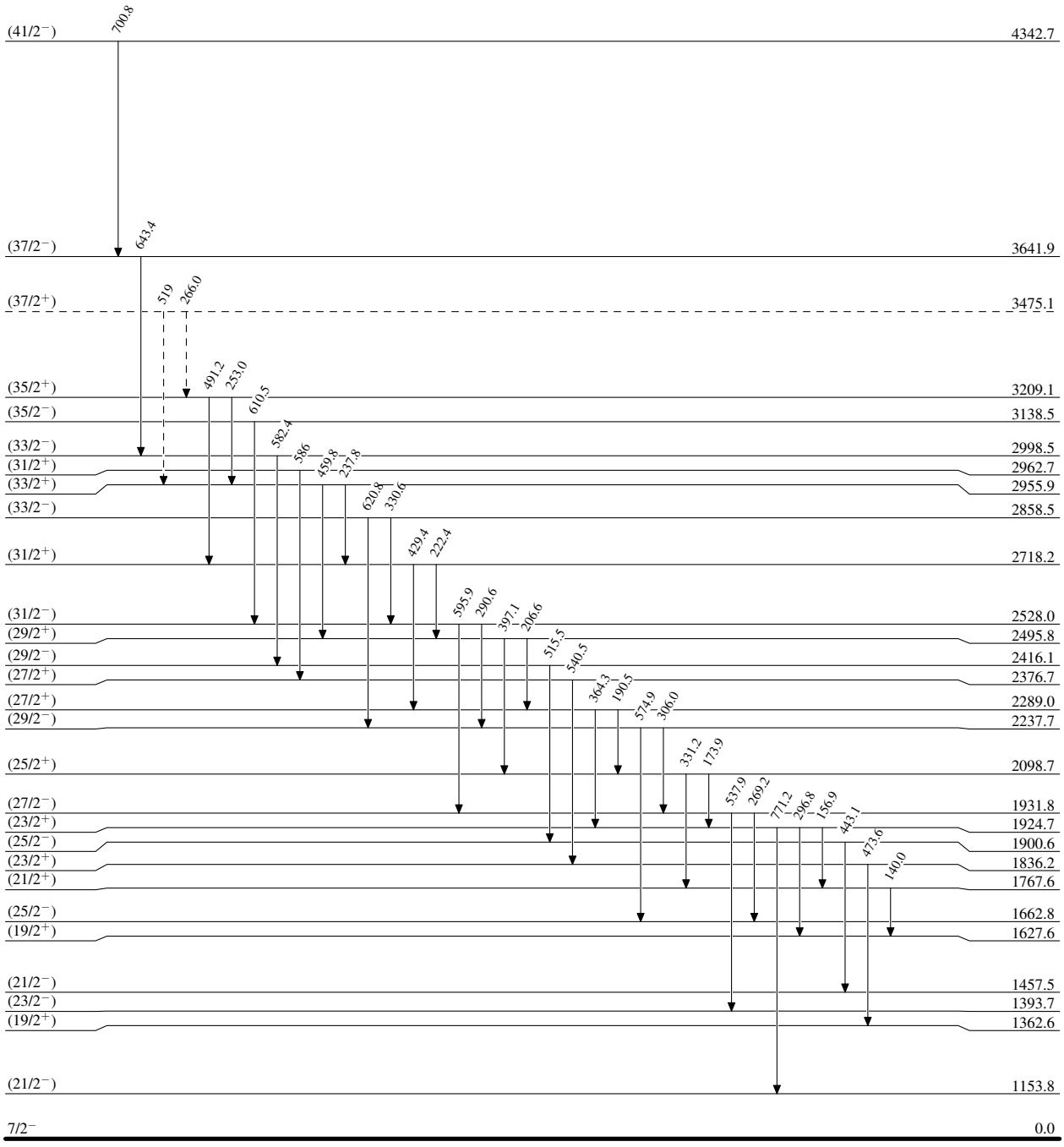
[†] Placement of transition in the level scheme is uncertain.

Legend

^{160}Gd(^{11}B,α4nγ) 2004Ho19

Level Scheme

γ Decay (Uncertain)



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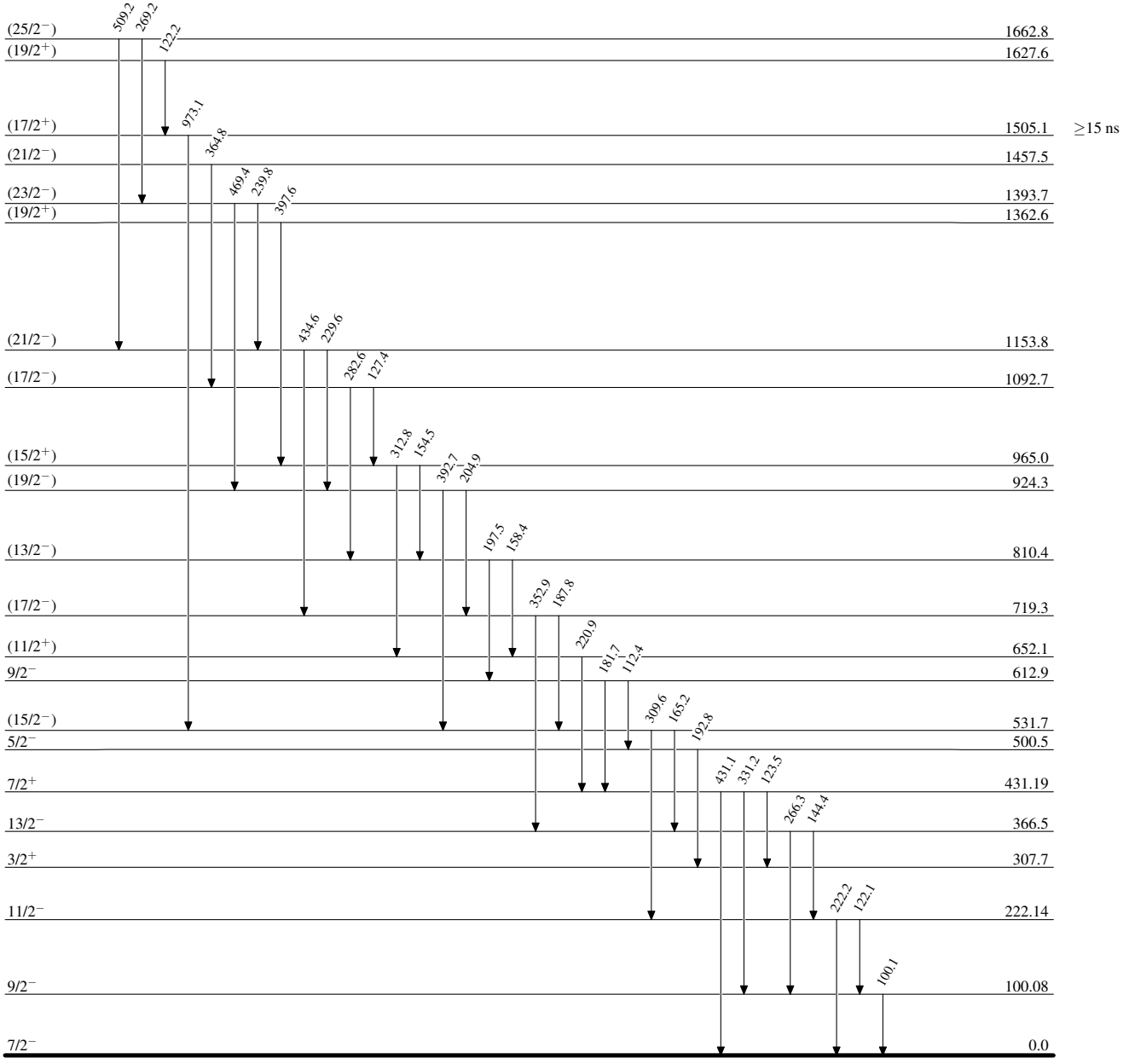
Level Scheme (continued)



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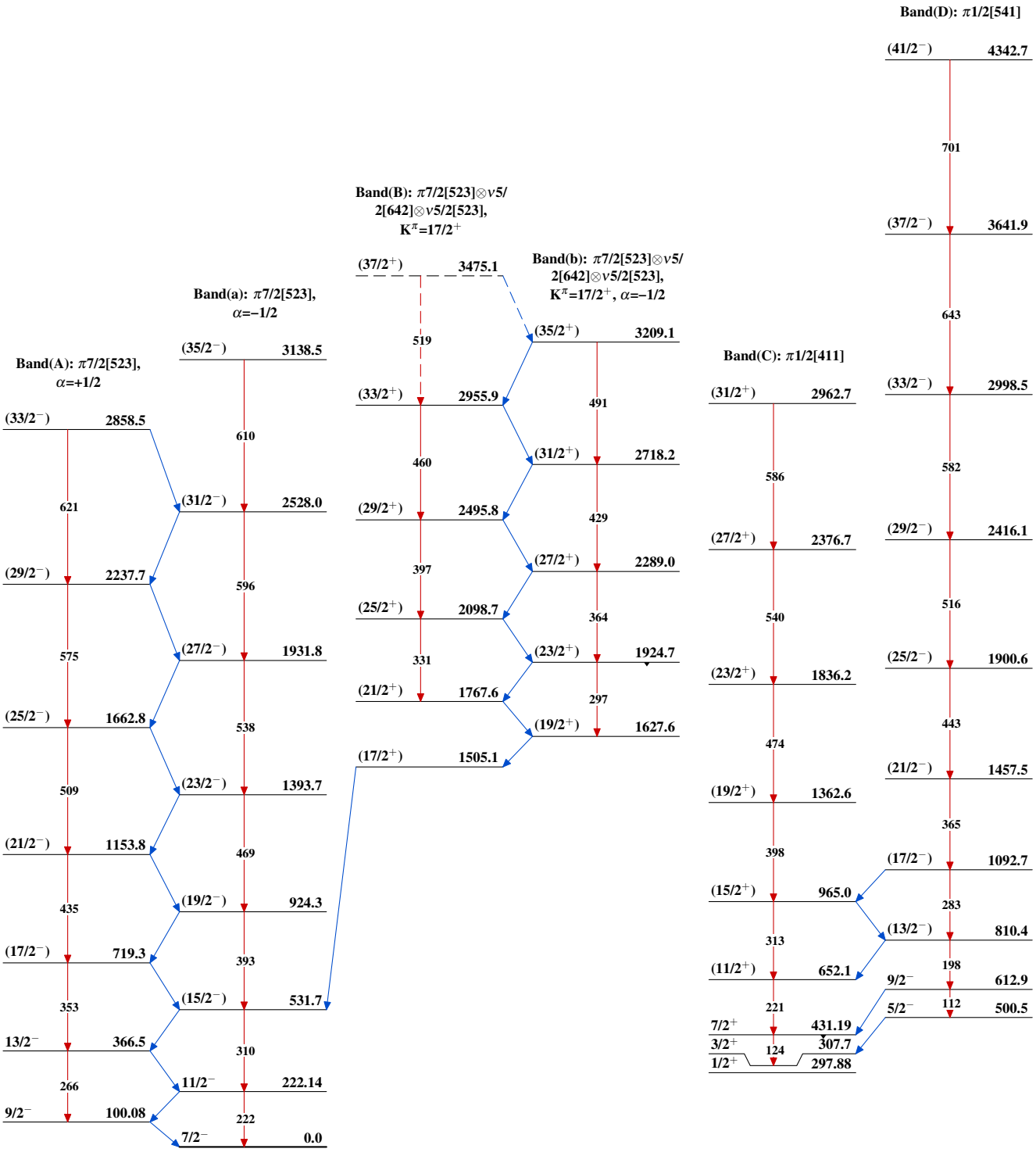

$^{163}_{67}Ho_{96}$