

$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ 1999Lu03,1996YuZY

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 141, 1 (2017)	1-Feb-2017

1999Lu03: $E(^{11}\text{B})=60$ MeV, $\gamma\gamma$ coincidences measured with array of 8 Compton-suppressed HPGe detectors and 1 planar HPGe detector. Report 4 bands with highest J^π of 25^- . All data are from their decay scheme; no level energies, I_γ values, or E_γ uncertainties are reported.

1996YuZY: $E(^{14}\text{N})=92$ MeV, $\gamma\gamma$ coincidences measured with Gammasphere array of 36 Ge detectors. Report they observed 10 bands, but data given for only 2 bands. All data are from their decay scheme; no level energies, I_γ values, or E_γ uncertainties are reported.

 ^{158}Ho Levels

E(level) [†]	J^π [‡]	$T_{1/2}$	Comments
0.0 [#]	5 ⁺		
102.8 [@]	6 ⁺		
156.9	(5 ⁻)	29 ns 3	J^π : Authors' assignment, but they note that in some other even-mass Ho isotopes the isomeric state is 6 ⁻ . $T_{1/2}$: from ^{158}Ho Adopted Levels.
180. ^e CA	9 ⁺	21.3 min 23	E(level): From calculations of 1986So02 for ε decay of this level; however, 1999Lu03 did not observe γ 's linking this band to other levels. $T_{1/2}$: from ^{158}Ho Adopted Levels.
207.7 ^b	8 ⁻		
225.0 [#]	7 ⁺		
278.5 ^c	9 ⁻		
279.2 ^{&}	7 ⁺		
359.3 ^a	8 ⁺		
368.0 [@]	8 ⁺		
379.0 ^b	10 ⁻		
405. ^d	10 ⁺		
454.4 ^{&}	9 ⁺		
493.9 ^c	11 ⁻		
531.5 [#]	9 ⁺		
582.2 ^a	10 ⁺		
652. ^e	11 ⁺		
653.2 ^b	12 ⁻		
715.8 [@]	10 ⁺		
735.7 ^{&}	11 ⁺		
819.2 ^c	13 ⁻		
917.2 [#]	11 ⁺		
918. ^d	12 ⁺		
918.7 ^a	12 ⁺		
1032.5 ^b	14 ⁻		
1111.4 [@]	12 ⁺		
1120.0 ^{&}	13 ⁺		
1200. ^e	13 ⁺		
1254.7 ^c	15 ⁻		
1349.3 ^a	14 ⁺		
1362.0 [#]	13 ⁺		
1497. ^d	14 ⁺		

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$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ **1999Lu03,1996YuZY (continued)** ^{158}Ho Levels (continued)

$E(\text{level})^\dagger$	J^π	$E(\text{level})^\dagger$	J^π	$E(\text{level})^\dagger$	J^π	$E(\text{level})^\dagger$	J^π
1510.2 ^b	16 ⁻	2728.5 ^{&}	19 ⁺	5476. ^{&}	27 ⁺	9168. ^c	35 ⁻
1557.2 [@]	14 ⁺	2765. ^d	18 ⁺	5734. ^b	28 ⁻	9565. ^b	36 ⁻
1590.1 ^{&}	15 ⁺	3051.6 ^a	20 ⁺	5903. ^a	28 ⁺	9599. ^a	36 ⁺
1788.2 ^c	17 ⁻	3085.7 ^c	21 ⁻	6219. ^c	29 ⁻	10107. ^{&}	37 ⁺
1806. ^e	15 ⁺	3366. ^{&}	21 ⁺	6342. ^{&}	29 ⁺	10286. ^c	37 ⁻
1859.9 ^a	16 ⁺	3405.0 ^b	22 ⁻	6604. ^b	30 ⁻	10628. ^b	38 ⁻
1868.3 [#]	15 ⁺	3688. ^a	22 ⁺	6792. ^a	30 ⁺	10631. ^a	38 ⁺
2013.7 [@]	16 ⁺	3813.1 ^c	23 ⁻	7132. ^c	31 ⁻	11163. ^{&}	39 ⁺
2074.2 ^b	18 ⁻	4001. ^{&}	23 ⁺	7235. ^{&}	31 ⁺	11673. ^b	40 ⁻
2121.8 ^d	16 ⁺	4143.4 ^b	24 ⁻	7535. ^b	32 ⁻	11712. ^a	40 ⁺
2132.3 ^{&}	17 ⁺	4339. ^a	24 ⁺	7685. ^a	32 ⁺	12266. ^{&}	41 ⁺
2404.1 ^c	19 ⁻	4574. ^c	25 ⁻	8115. ^c	33 ⁻	12766. ^b	42 ⁻
2431.2 ^a	18 ⁺	4693. ^{&}	25 ⁺	8144. ^{&}	33 ⁺	12845. ^a	42 ⁺
2433.8 [#]	17 ⁺	4917. ^b	26 ⁻	8525. ^b	34 ⁻	13422. ^{&}	43 ⁺
2444. ^e	17 ⁺	5079. ^a	26 ⁺	8618. ^a	34 ⁺		
2710.9 ^b	20 ⁻	5370. ^c	27 ⁻	9101. ^{&}	35 ⁺		

[†] From unweighted least-squares fit to γ energies.

[‡] From assignments of 1999Lu03 and evaluator's assignments based on level sequences of 1996YuZY above the levels reported by 1999Lu03. For band "B" and "b", 1996YuZY give the opposite parity and for the bands "B", "b", "C", and "c", 1996YuZY give spins that are 1 or 2 units lower. Also, 1995Li40 for discussion of J^π assignments.

Band(A): $K^\pi=5^+$ ground-state band, $\pi 7/2[523] \nu 3/2[521]$, $\alpha=1$.

@ Band(a): $K^\pi=5^+$ ground-state band, $\pi 7/2[523] \nu 3/2[521]$, $\alpha=0$.

& Band(B): $K^\pi=5^+$ band, $\pi 7/2[404] \nu 3/2[651]$, $\alpha=1$.

^a Band(b): $K^\pi=5^+$ band, $\pi 7/2[404] \nu 3/2[651]$, $\alpha=0$.

^b Band(C): $K^\pi=5^-$ band, $\pi 7/2[523] \nu 3/2[651]$, $\alpha=0$.

^c Band(c): $K^\pi=5^-$ band, $\pi 7/2[523] \nu 3/2[651]$, $\alpha=1$.

^d Band(D): $K^\pi=9^+$ band, $\pi 7/2[523] \nu 11/2[505]$, $\alpha=0$.

^e Band(d): $K^\pi=9^+$ band, $\pi 7/2[523] \nu 11/2[505]$, $\alpha=1$.

 $\gamma(^{158}\text{Ho})$

$E_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	$E_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	$E_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π
70.8	278.5	9 ⁻	207.7	8 ⁻	165.7	819.2	13 ⁻	653.2	12 ⁻	224.9	225.0	7 ⁺	0.0	5 ⁺
80.2	359.3	8 ⁺	279.2	7 ⁺	171.3	379.0	10 ⁻	207.7	8 ⁻	225.0	405.	10 ⁺	180.	9 ⁺
95.4	454.4	9 ⁺	359.3	8 ⁺	174.9	454.4	9 ⁺	279.2	7 ⁺	229.3	1349.3	14 ⁺	1120.0	13 ⁺
100.3	379.0	10 ⁻	278.5	9 ⁻	176.	279.2	7 ⁺	102.8	6 ⁺	240.6	1590.1	15 ⁺	1349.3	14 ⁺
102.7	102.8	6 ⁺	0.0	5 ⁺	182.5	918.7	12 ⁺	735.7	11 ⁺	246.6	454.4	9 ⁺	207.7	8 ⁻
115.1	493.9	11 ⁻	379.0	10 ⁻	183.9	715.8	10 ⁺	531.5	9 ⁺	247.3	652.	11 ⁺	405.	10 ⁺
121.8	225.0	7 ⁺	102.8	6 ⁺	194.3	1111.4	12 ⁺	917.2	11 ⁺	250.9	1362.0	13 ⁺	1111.4	12 ⁺
127.4	582.2	10 ⁺	454.4	9 ⁺	195.7	1557.2	14 ⁺	1362.0	13 ⁺	255.4	1510.2	16 ⁻	1254.7	15 ⁻
134.2	359.3	8 ⁺	225.0	7 ⁺	201.0	1120.0	13 ⁺	918.7	12 ⁺	257.	359.3	8 ⁺	102.8	6 ⁺
142.9	368.0	8 ⁺	225.0	7 ⁺	201.4	917.2	11 ⁺	715.8	10 ⁺	265.5	368.0	8 ⁺	102.8	6 ⁺
153.3	735.7	11 ⁺	582.2	10 ⁺	213.7	1032.5	14 ⁻	819.2	13 ⁻	265.6	918.	12 ⁺	652.	11 ⁺
156.9	156.9	(5 ⁻)	0.0	5 ⁺	215.7	493.9	11 ⁻	278.5	9 ⁻	270.7	1859.9	16 ⁺	1590.1	15 ⁺
159.4	653.2	12 ⁻	493.9	11 ⁻	221.8	1254.7	15 ⁻	1032.5	14 ⁻	272.5	2132.3	17 ⁺	1859.9	16 ⁺
163.4	531.5	9 ⁺	368.0	8 ⁺	222.9	582.2	10 ⁺	359.3	8 ⁺	274.1	653.2	12 ⁻	379.0	10 ⁻

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$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ **1999Lu03,1996YuZY (continued)** $\gamma(^{158}\text{Ho})$ (continued)

E_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π
277.3	1788.2?	17 ⁻	1510.2	16 ⁻	477.3	1510.2	16 ⁻	1032.5	14 ⁻
279.3	279.2	7 ⁺	0.0	5 ⁺	485.‡	6219.	29 ⁻	5734.	28 ⁻
281.6	735.7	11 ⁺	454.4	9 ⁺	506.3	1868.3	15 ⁺	1362.0	13 ⁺
282.1	1200.	13 ⁺	918.	12 ⁺	510.6	1859.9	16 ⁺	1349.3	14 ⁺
285.6	2074.2?	18 ⁻	1788.2?	17 ⁻	513.4	918.	12 ⁺	405.	10 ⁺
296.1	1497.	14 ⁺	1200.	13 ⁺	527.‡	7132.	31 ⁻	6604.	30 ⁻
298.‡	2728.5	19 ⁺	2431.2	18 ⁺	529.8	1349.3	14 ⁺	819.2	13 ⁻
299.3	2431.2	18 ⁺	2132.3	17 ⁺	532.9	1788.2?	17 ⁻	1254.7	15 ⁻
303.7	582.2	10 ⁺	278.5	9 ⁻	542.4	2132.3	17 ⁺	1590.1	15 ⁺
306.4	531.5	9 ⁺	225.0	7 ⁺	548.4	1200.	13 ⁺	652.	11 ⁺
307.2	2710.9?	20 ⁻	2404.1?	19 ⁻	559.‡	1590.1	15 ⁺	1032.5	14 ⁻
309.3	1806.	15 ⁺	1497.	14 ⁺	564.6	2074.2?	18 ⁻	1510.2	16 ⁻
313.‡	4001.	23 ⁺	3688.	22 ⁺	565.5	2433.8	17 ⁺	1868.3	15 ⁺
315.‡	3366.	21 ⁺	3051.6	20 ⁺	571.9	2431.2	18 ⁺	1859.9	16 ⁺
315.9	2121.8	16 ⁺	1806.	15 ⁺	578.9	1497.	14 ⁺	918.	12 ⁺
319.0	3405.0	22 ⁻	3085.7	21 ⁻	595.9	2728.5	19 ⁺	2132.3	17 ⁺
321.‡	3688.	22 ⁺	3366.	21 ⁺	605.‡	1859.9	16 ⁺	1254.7	15 ⁻
324.‡	3051.6	20 ⁺	2728.5	19 ⁺	605.6	1806.	15 ⁺	1200.	13 ⁺
325.3	819.2	13 ⁻	493.9	11 ⁻	615.8	2404.1?	19 ⁻	1788.2?	17 ⁻
329.8	2404.1?	19 ⁻	2074.2?	18 ⁻	620.0	3051.6	20 ⁺	2431.2	18 ⁺
330.0	4143.4	24 ⁻	3813.1	23 ⁻	622.‡	2132.3	17 ⁺	1510.2	16 ⁻
336.3	918.7	12 ⁺	582.2	10 ⁺	624.8	2121.8	16 ⁺	1497.	14 ⁺
337.‡	4339.	24 ⁺	4001.	23 ⁺	635.‡	4001.	23 ⁺	3366.	21 ⁺
342.‡	4917.	26 ⁻	4574.	25 ⁻	636.‡	3688.	22 ⁺	3051.6	20 ⁺
348.1	715.8	10 ⁺	368.0	8 ⁺	636.4	2710.9?	20 ⁻	2074.2?	18 ⁻
353.‡	4693.	25 ⁺	4339.	24 ⁺	638.‡	3366.	21 ⁺	2728.5	19 ⁺
356.4	735.7	11 ⁺	379.0	10 ⁻	638.5	2444.	17 ⁺	1806.	15 ⁺
363.‡	5734.	28 ⁻	5370.	27 ⁻	642.‡	2431.2	18 ⁺	1788.2?	17 ⁻
374.5	3085.7	21 ⁻	2710.9?	20 ⁻	642.9	2765.	18 ⁺	2121.8	16 ⁺
379.6	1032.5	14 ⁻	653.2	12 ⁻	647.‡	3051.6	20 ⁺	2404.1?	19 ⁻
384.‡	6604.	30 ⁻	6219.	29 ⁻	652.‡	4339.	24 ⁺	3688.	22 ⁺
384.5	1120.0	13 ⁺	735.7	11 ⁺	655.‡	2728.5	19 ⁺	2074.2?	18 ⁻
385.‡	5079.	26 ⁺	4693.	25 ⁺	681.4	3085.7	21 ⁻	2404.1?	19 ⁻
385.9	917.2	11 ⁺	531.5	9 ⁺	692.‡	4693.	25 ⁺	4001.	23 ⁺
395.3	1111.4	12 ⁺	715.8	10 ⁺	694.6	3405.0	22 ⁻	2710.9?	20 ⁻
396.‡	5476.	27 ⁺	5079.	26 ⁺	727.4	3813.1	23 ⁻	3085.7	21 ⁻
408.0	3813.1	23 ⁻	3405.0	22 ⁻	738.5	4143.4	24 ⁻	3405.0	22 ⁻
425.2	918.7	12 ⁺	493.9	11 ⁻	740.‡	5079.	26 ⁺	4339.	24 ⁺
426.‡	5903.	28 ⁺	5476.	27 ⁺	761.‡#	4574.	25 ⁻	3813.1	23 ⁻
430.‡	4574.	25 ⁻	4143.4	24 ⁻	774.‡	4917.	26 ⁻	4143.4	24 ⁻
430.7	1349.3	14 ⁺	918.7	12 ⁺	783.‡	5476.	27 ⁺	4693.	25 ⁺
435.2	1254.7	15 ⁻	819.2	13 ⁻	797.‡	5370.	27 ⁻	4574.	25 ⁻
439.‡	6342.	29 ⁺	5903.	28 ⁺	817.‡	5734.	28 ⁻	4917.	26 ⁻
443.‡	7235.	31 ⁺	6792.	30 ⁺	824.‡	5903.	28 ⁺	5079.	26 ⁺
444.9	1362.0	13 ⁺	917.2	11 ⁺	849.‡	6219.	29 ⁻	5370.	27 ⁻
445.4	1557.2	14 ⁺	1111.4	12 ⁺	868.‡	6342.	29 ⁺	5476.	27 ⁺
453.‡	5370.	27 ⁻	4917.	26 ⁻	871.‡	6604.	30 ⁻	5734.	28 ⁻
456.5	2013.7	16 ⁺	1557.2	14 ⁺	889.‡	6792.	30 ⁺	5903.	28 ⁺
466.9	1120.0	13 ⁺	653.2	12 ⁻	893.‡	7235.	31 ⁺	6342.	29 ⁺
470.1	1590.1	15 ⁺	1120.0	13 ⁺	893.‡	7685.	32 ⁺	6792.	30 ⁺

$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ **1999Lu03,1996YuZY (continued)**

$\gamma(^{158}\text{Ho})$ (continued)

E_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π
472.1	652.	11 ⁺	180.	9 ⁺	909.‡	8144.	33 ⁺	7235.	31 ⁺

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$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ **1999Lu03,1996YuZY (continued)**

$\gamma(^{158}\text{Ho})$ (continued)

$E_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	$E_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π
913. [‡]	7132.	31 ⁻	6219.	29 ⁻	1045. [‡]	11673.	40 ⁻	10628.	38 ⁻
931. [‡]	7535.	32 ⁻	6604.	30 ⁻	1053. [‡]	9168.	35 ⁻	8115.	33 ⁻
933. [‡]	8618.	34 ⁺	7685.	32 ⁺	1056. [‡]	11163.	39 ⁺	10107.	37 ⁺
957. [‡]	9101.	35 ⁺	8144.	33 ⁺	1063. [‡]	10628.	38 ⁻	9565.	36 ⁻
981. [‡]	9599.	36 ⁺	8618.	34 ⁺	1081. [‡]	11712.	40 ⁺	10631.	38 ⁺
983. [‡]	8115.	33 ⁻	7132.	31 ⁻	1093. [‡]	12766.	42 ⁻	11673.	40 ⁻
990. [‡]	8525.	34 ⁻	7535.	32 ⁻	1103. [‡]	12266.	41 ⁺	11163.	39 ⁺
1006. [‡]	10107.	37 ⁺	9101.	35 ⁺	1118. [‡]	10286.	37 ⁻	9168.	35 ⁻
1032. [‡]	10631.	38 ⁺	9599.	36 ⁺	1133. [‡]	12845.	42 ⁺	11712.	40 ⁺
1040. [‡]	9565.	36 ⁻	8525.	34 ⁻	1156. [‡]	13422.	43 ⁺	12266.	41 ⁺

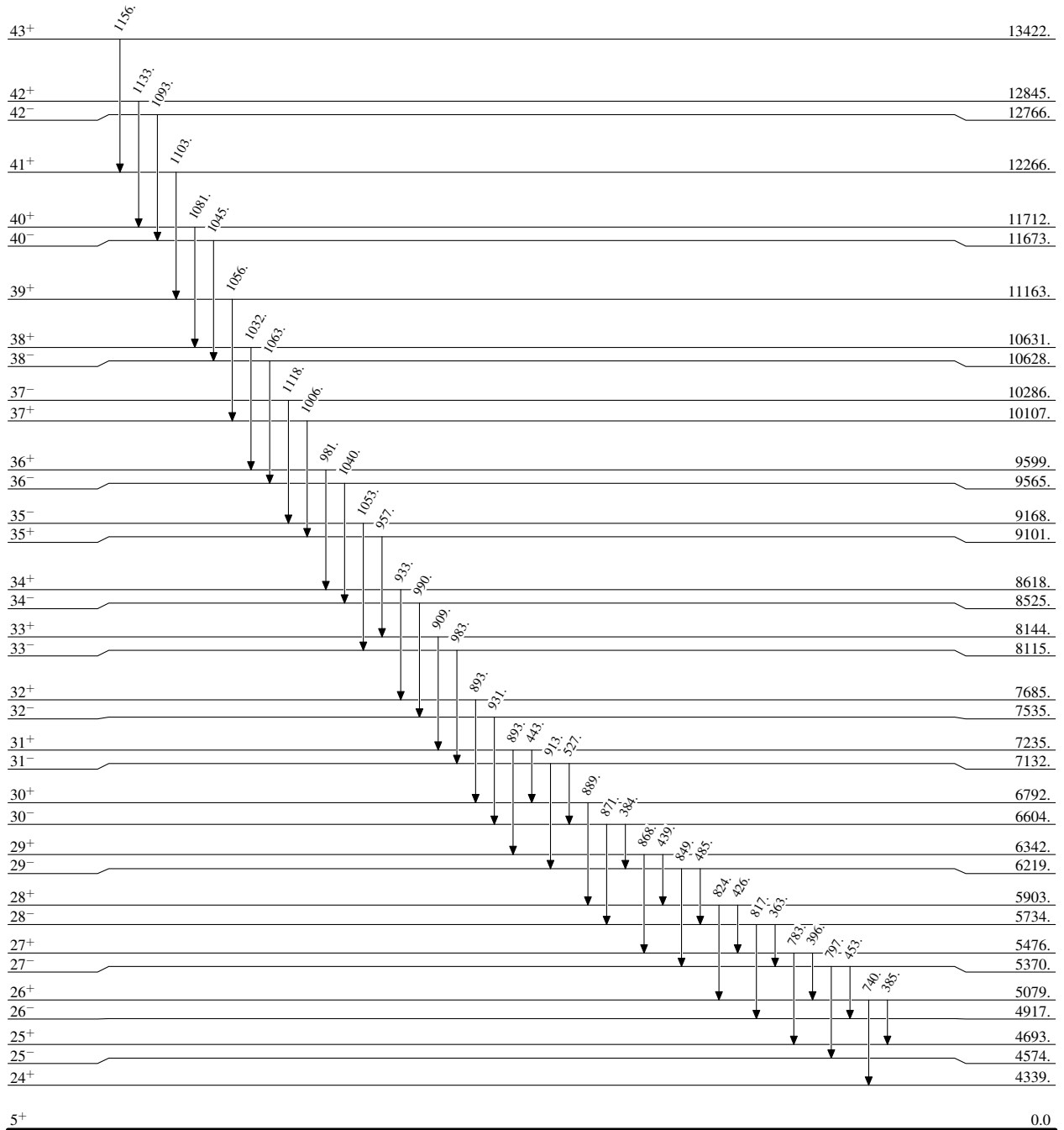
[†] From 1999Lu03, unless otherwise noted; no uncertainties are reported.

[‡] From 1996YuZY.

[#] From 1996YuZY; other: 772.0 from 1999Lu03, but this γ is placed from 4915 level.

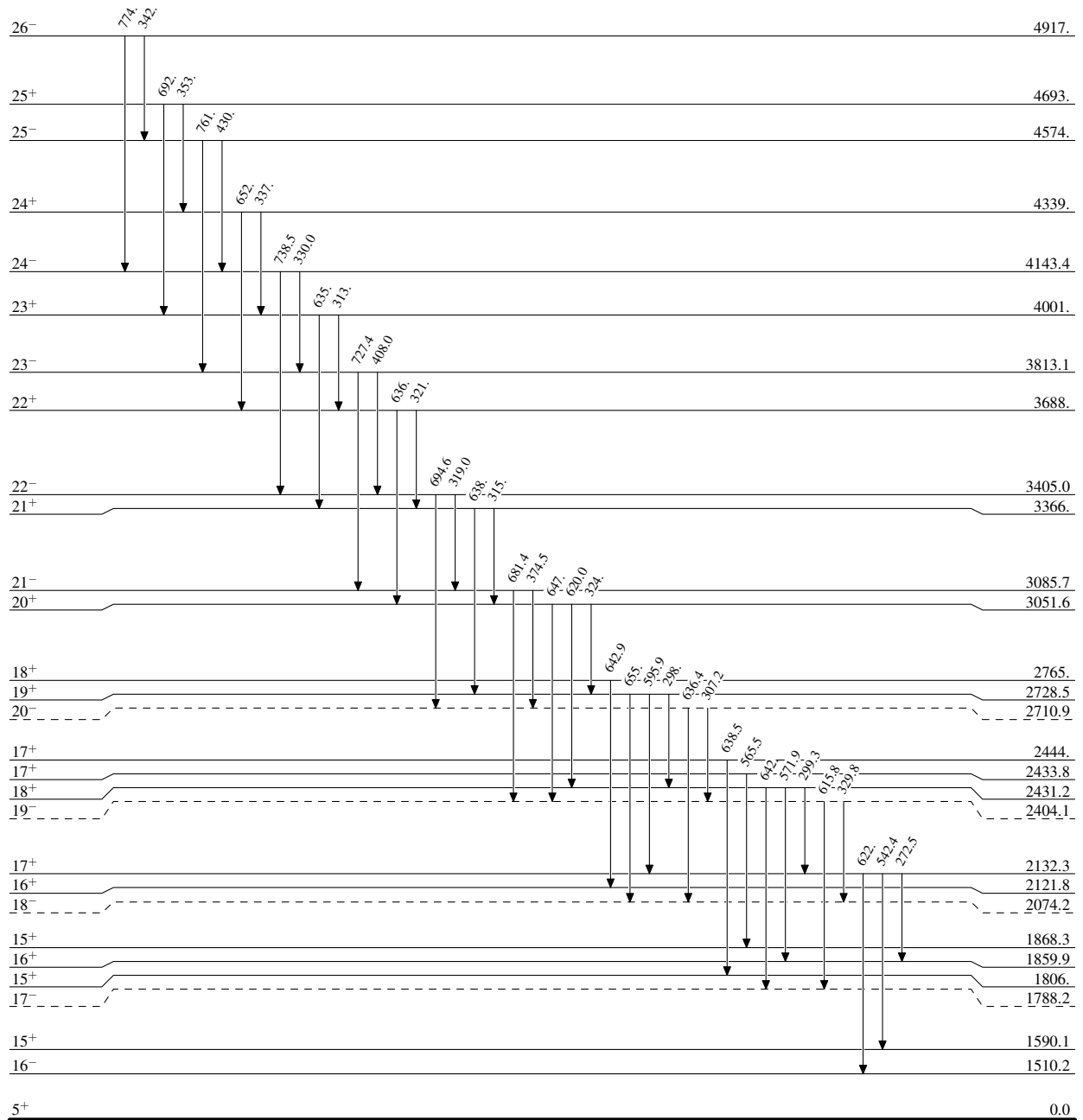
$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ 1999Lu03,1996YuZY

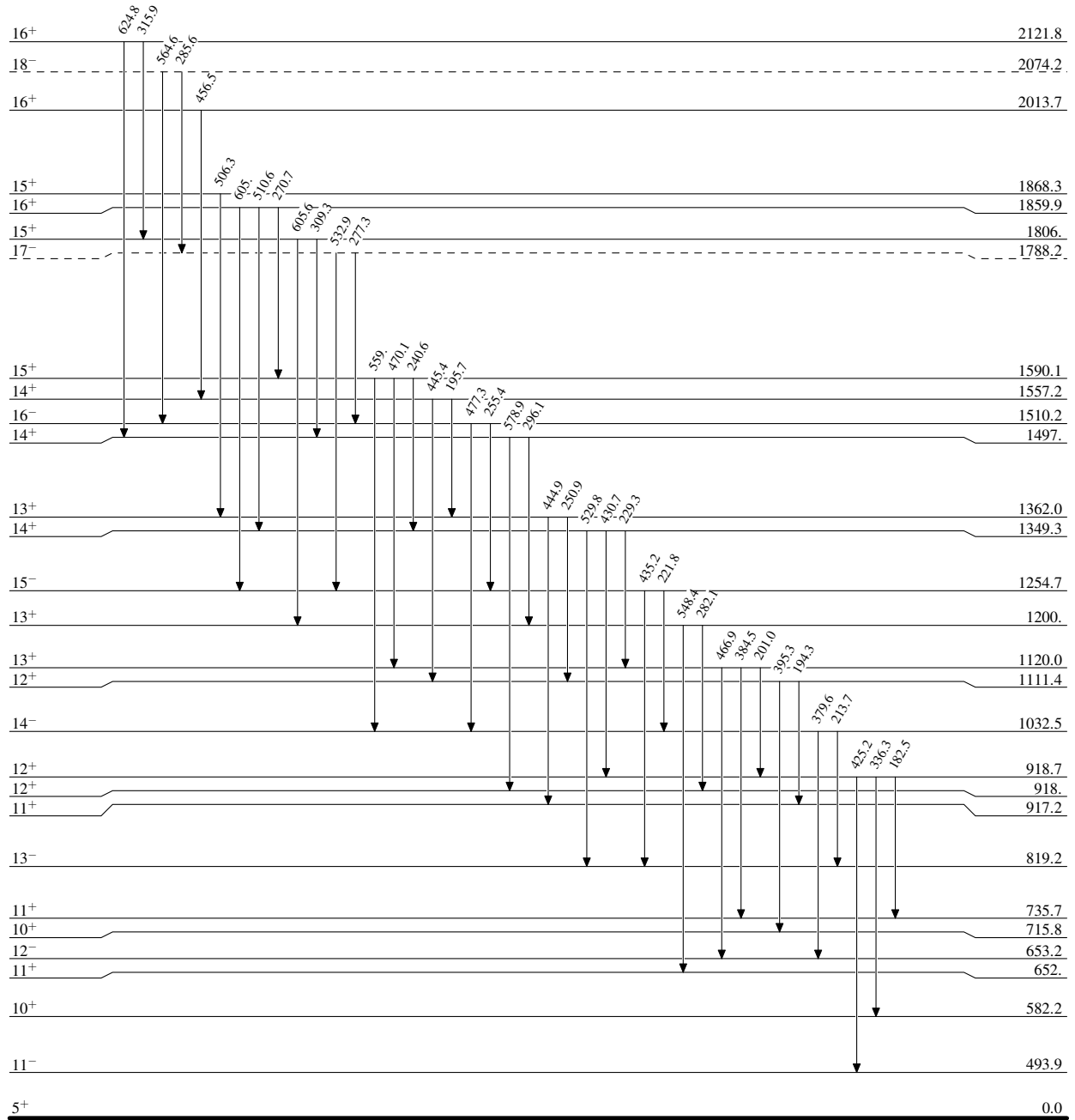
Level Scheme

 $^{158}_{67}\text{Ho}_{91}$

$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ 1999Lu03,1996YuZY

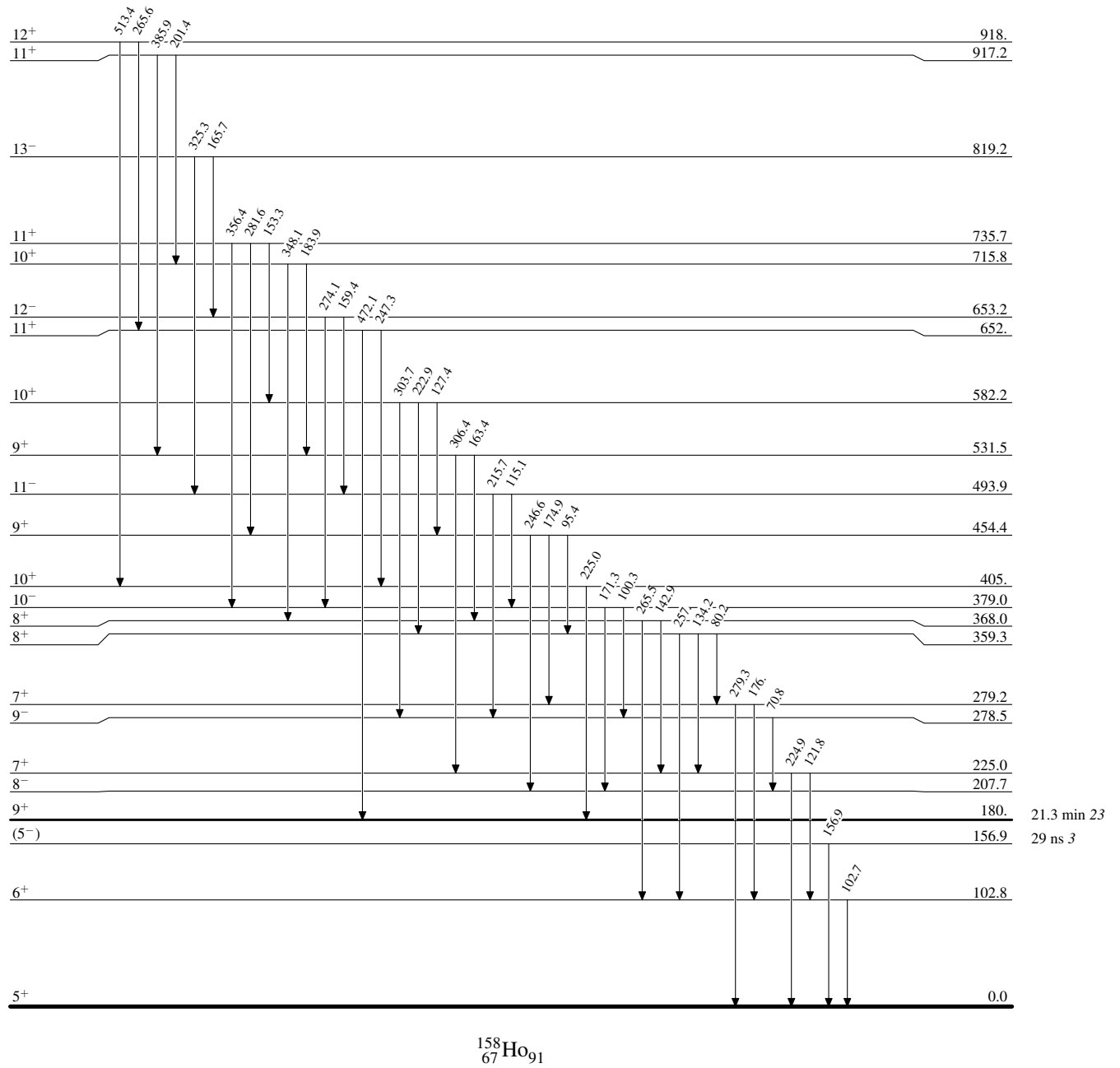
Level Scheme (continued)

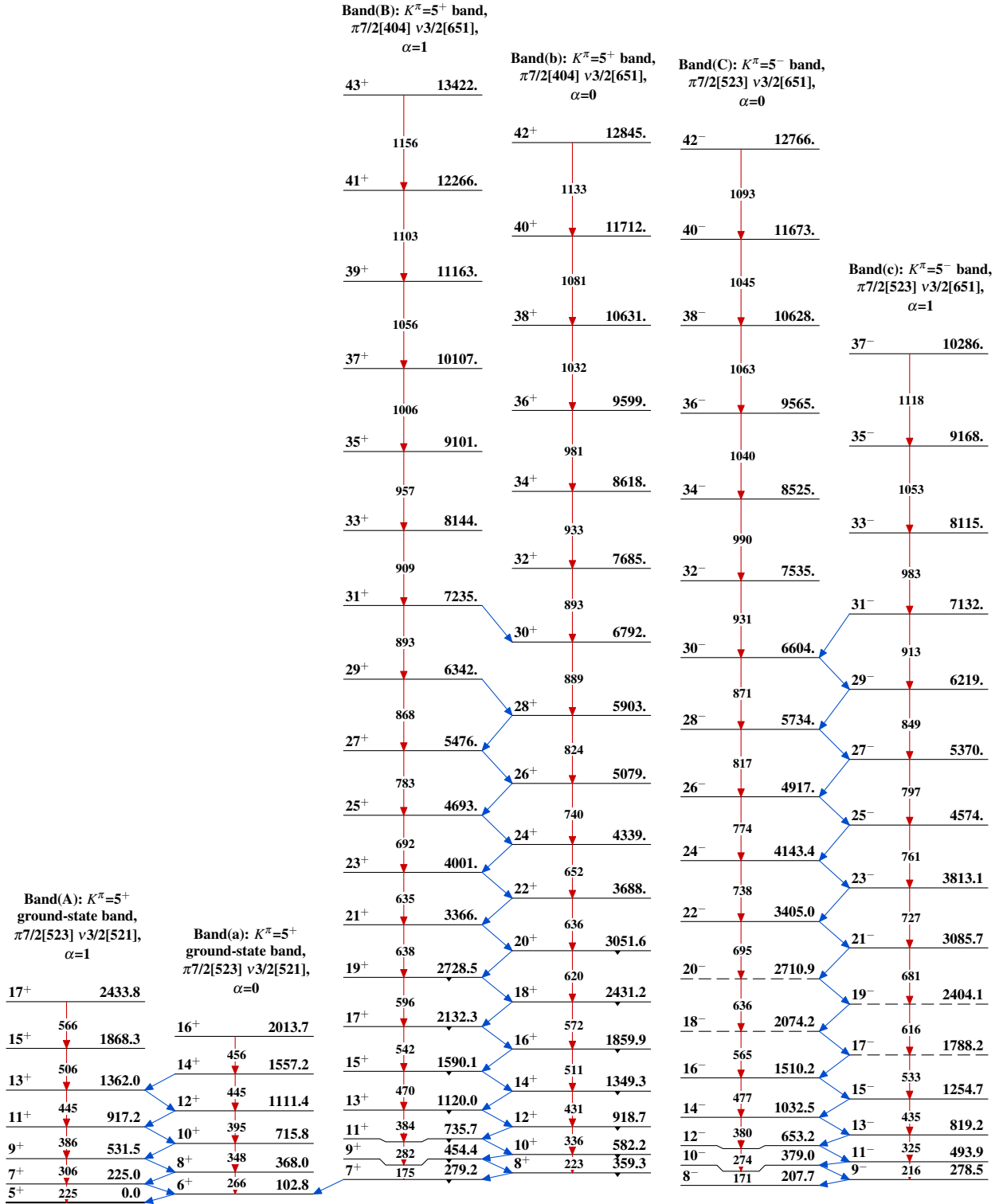


$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ 1999Lu03,1996YuZYLevel Scheme (continued)

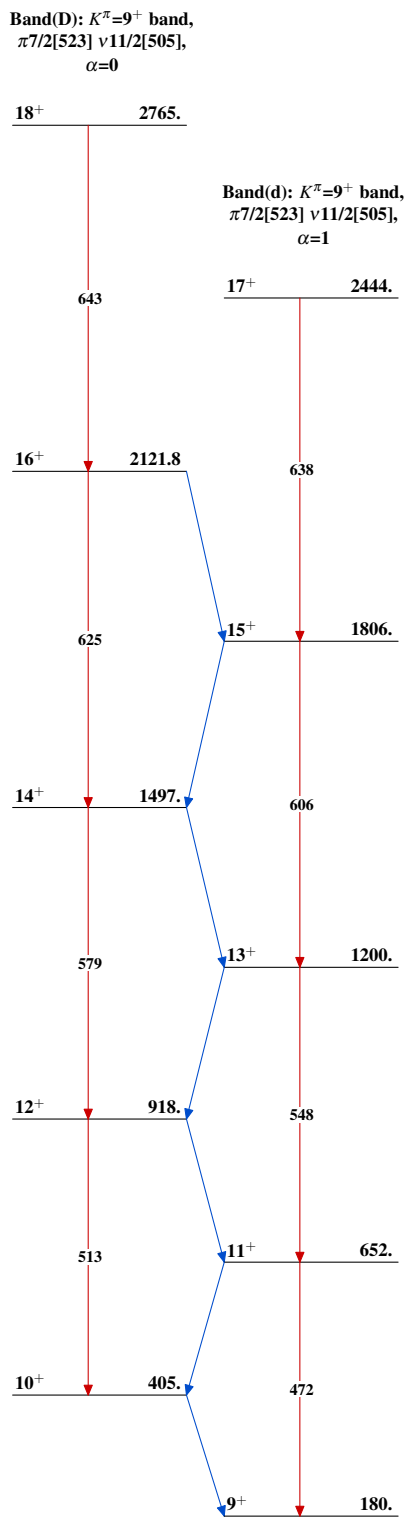
$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ 1999Lu03,1996YuZY

Level Scheme (continued)



$^{152}\text{Sm}(^{11}\text{B},5\text{n}\gamma), ^{150}\text{Nd}(^{14}\text{N},6\text{n}\gamma)$ 1999Lu03,1996YuZY

$^{152}\text{Sm}(^{11}\text{B},5n\gamma), ^{150}\text{Nd}(^{14}\text{N},6n\gamma)$ **1999Lu03,1996YuZY (continued)**



$^{158}_{67}\text{Ho}_{91}$