

(HI,xn γ) 1995Se08,1993Jo07,1998Ka54

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 108,2035 (2007)	30-Mar-2007

1992OgZX: $^{54}\text{Fe}(^{54}\text{Fe},3\text{pn}\gamma)$ E=not given. Measured: γ , $\gamma\gamma$.

1995Se08,1993Jo07,1993Ko10 (all the same Group): $^{58}\text{Ni}(^{54}\text{Fe},\text{xnp})$ E=270 MeV measured: 15 Ge-BGO spectrometers, 4 π charge particle detectors, 2 π γ -ray calorimeter (30 BaF2), 1 π neutron detector (11 scin), 420 million $\gamma\gamma$ coin between γ , n, a particles. The experimental for ^{104}In was estimated to be 0.9% of the total production.

1998Ka54: $^{58}\text{Ni}(^{50}\text{Cr},\text{xnp})$ E=205 MeV. Measured: $T_{1/2}$, using a plunger apparatus and the γ spectrometer "GASP" at XTU tandem accelerator of the INFN at Legnaro, 40 Ge-BGO spectrometers.

The level scheme is as given by 1995Se08.

 ^{104}In Levels

E(level)	$J^{\pi\dagger}$	$T_{1/2}^{\dagger}$	E(level)	$J^{\pi\dagger}$	$T_{1/2}^{\dagger}$	E(level)	$J^{\pi\dagger}$	$T_{1/2}^{\dagger}$
0.0	(6 ⁺)		1944.10 5	(11 ⁺)	0.8 ps 3	3566.53 15	(12 ⁻)	0.40 ps 6
85.389 @ 10	(7 ⁺)		2004.32 # 8	(9 ⁻)		3817.57 # 15	(13 ⁻)	<3.4 ps
213.011 10	(7 ⁺)	6.1 ps 3	2031.26 16	(10 ⁺)		3836.0 3	(12 ⁻)	
933.69 @ 5	(8 ⁺)		2415.1 10	(11 ⁺)		3965.93 18	(13 ⁻)	
1140.54 6	(7 ⁺)		2529.16 # 10	(10 ⁻)	<3.4 ps	4071.8 4	(13 ⁻)	
1344.29 @ 4	(9 ⁺)	3.5 ps 7	2696.27 @ 7	(12 ⁺)	1.6 ps 2	4103.44 # 15	(14 ⁻)	0.60 ps 5
1411.51 4	(9 ⁺)		2869.50 11	(12 ⁺)		4326.46 19	(14 ⁻)	
1571.56 14	(9 ⁺)		2985.09 @ 7	(13 ⁺)		4437.81 @ 16	(14 ⁺)	
1586.66 @ 4	(10 ⁺)	26.6 ps 14	3061.71 11	(13 ⁺)		4643.33 # 16	(15 ⁻)	0.7 ps 3
1817.87 # 9	(8 ⁻)		3102.9 # 15	(11 ⁻)	<3.4 ps	5204.29 # 17	(16 ⁻)	
1879.82 @ 5	(11 ⁺)		3323.37 12	(13 ⁺)		5625.96 # 20	(17 ⁻)	
1928.99 14	(10 ⁺)		3561.08 # 15	(12 ⁻)	<3.4 ps	6153.09 # 23	(18 ⁻)	

[†] From 1998Ka54 using recoil-distance Doppler Shift (RDDS).

[‡] From 1995Se08 based on DCO.

Band(A): negative parity band.

@ Band(B): positive parity band.

 $\gamma(^{104}\text{In})$

$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	$E_i(\text{level})$	J_i^{π}	E_f	J_f^{π}	Mult.
85.39 1	82.1 16	85.389	(7 ⁺)	0.0	(6 ⁺)	
127.73 11	2.6 6	213.011	(7 ⁺)	85.389	(7 ⁺)	D
^x 137.55 7	7.8 6					
175.15 1	85.3 14	1586.66	(10 ⁺)	1411.51	(9 ⁺)	D
186.50 6	17.4 12	2004.32	(9 ⁻)	1817.87	(8 ⁻)	D
203.64 6	12.1 7	1344.29	(9 ⁺)	1140.54	(7 ⁺)	
213.01 1	100.0 5	213.011	(7 ⁺)	0.0	(6 ⁺)	
235.78 13	4.8 6	4071.8	(13 ⁻)	3836.0	(12 ⁻)	D
242.34 3	24.4 9	1586.66	(10 ⁺)	1344.29	(9 ⁺)	D
250.81 8	67.5 13	3817.57	(13 ⁻)	3566.53	(12 ⁻)	D
256.60 5	15.9 8	3817.57	(13 ⁻)	3561.08	(12 ⁻)	D
285.87 2	82.1 14	4103.44	(14 ⁻)	3817.57	(13 ⁻)	D
288.77 5	15.8 8	2985.09	(13 ⁺)	2696.27	(12 ⁺)	D
293.14 3	37.1 10	1879.82	(11 ⁺)	1586.66	(10 ⁺)	D
357.43 ‡ 2	93.2 ‡ 16	1928.99	(10 ⁺)	1571.56	(9 ⁺)	D

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(HI,xn γ) 1995Se08,1993Jo07,1998Ka54 (continued) $\gamma(^{104}\text{In})$ (continued)

E_γ †	I_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	Comments
357.43 ‡ 2	93.2 ‡ 16	1944.10	(11 ⁺)	1586.66	(10 ⁺)	D	
360.53 7	13.6 8	4326.46	(14 ⁻)	3965.93	(13 ⁻)	D	
365.45 9	9.1 7	3061.71	(13 ⁺)	2696.27	(12 ⁺)	D	
399.34 19	5.1 9	3965.93	(13 ⁻)	3566.53	(12 ⁻)	D	
404.89 13	6.8 8	3965.93	(13 ⁻)	3561.08	(12 ⁻)	D	
410.87 17	5.4 8	1344.29	(9 ⁺)	933.69	(8 ⁺)		
^x 415.3 2	4.6 6					D	E_γ : given in level scheme between 2416 and 2031? may be misprint?
421.67 10	23.0 18	5625.96	(17 ⁻)	5204.29	(16 ⁻)	D	
453.9 ‡ 2	4.6 ‡ 9	2869.50	(12 ⁺)	2415.1	(11 ⁺)	D	
453.9 ‡ 2	4.6 ‡ 9	3323.37	(13 ⁺)	2869.50	(12 ⁺)	D	
457.6 8	15.1 10	3561.08	(12 ⁻)	3102.9	(11 ⁻)	D	
463.53 4	32.9 12	3566.53	(12 ⁻)	3102.9	(11 ⁻)	D	
477.81 2	67.7 15	1411.51	(9 ⁺)	933.69	(8 ⁺)	D	
486.5 3	17.7 11	2415.1	(11 ⁺)	1928.99	(10 ⁺)	D	
524.5 3	41.0 14	2529.16	(10 ⁻)	2004.32	(9 ⁻)	D	
527.13 11	12.3 11	6153.09	(18 ⁻)	5625.96	(17 ⁻)	D	
539.89 5	43.3 18	4643.33	(15 ⁻)	4103.44	(14 ⁻)	D	
560.95 6	31.0 15	5204.29	(16 ⁻)	4643.33	(15 ⁻)	D	
572.8 3	36.8 14	3102.9	(11 ⁻)	2529.16	(10 ⁻)	D	
584.71 16	11.8 15	1928.99	(10 ⁺)	1344.29	(9 ⁺)	D	
619.75 15	8.5 10	2031.26	(10 ⁺)	1411.51	(9 ⁺)	D	
627.09 12	9.7 9	3323.37	(13 ⁺)	2696.27	(12 ⁺)	D	
637.2 3	7.3 10	1571.56	(9 ⁺)	933.69	(8 ⁺)	D	
653.01 9	13.7 12	1586.66	(10 ⁺)	933.69	(8 ⁺)	Q	
720.57 22	44 3	933.69	(8 ⁺)	213.011	(7 ⁺)	D	
752.15 6	22.2 12	2696.27	(12 ⁺)	1944.10	(11 ⁺)	D	
^x 807.73 16	9.0 11						
816.16 13	12.3 11	2696.27	(12 ⁺)	1879.82	(11 ⁺)	D	
828.3 3	3.9 9	2415.1	(11 ⁺)	1586.66	(10 ⁺)	D	
848.32 10	60.8 17	933.69	(8 ⁺)	85.389	(7 ⁺)	D	
864.06 8	19.3 13	2004.32	(9 ⁻)	1140.54	(7 ⁺)		
925.11 13	16.9 16	2869.50	(12 ⁺)	1944.10	(11 ⁺)	D	
927.55 13	16.7 16	1140.54	(7 ⁺)	213.011	(7 ⁺)	D	
^x 941.69 11	13.4 12						
946.7 5	7.9 11	3817.57	(13 ⁻)	2869.50	(12 ⁺)	D	
1031.3 3	4.2 7	3561.08	(12 ⁻)	2529.16	(10 ⁻)	Q	
1041.09 7	20.1 12	2985.09	(13 ⁺)	1944.10	(11 ⁺)	Q	
1055.28 11	13.9 11	1140.54	(7 ⁺)	85.389	(7 ⁺)	D	
1071.05 19	7.3 11	2004.32	(9 ⁻)	933.69	(8 ⁺)	D	
1097.3 3	14.2 12	3102.9	(11 ⁻)	2004.32	(9 ⁻)	Q	
1131.40 17	9.3 12	1344.29	(9 ⁺)	213.011	(7 ⁺)	Q	
1140.6 3	5.6 10	1140.54	(7 ⁺)	0.0	(6 ⁺)	Q	
1150.0 3	15.0 13	3566.53	(12 ⁻)	2415.1	(11 ⁺)	D	
1184.72 10	13.4 11	2529.16	(10 ⁻)	1344.29	(9 ⁺)	D	
1198.44 9	24.3 16	1411.51	(9 ⁺)	213.011	(7 ⁺)	Q	
1258.80 6	32.2 14	1344.29	(9 ⁺)	85.389	(7 ⁺)	Q	
1326.19 12	12.3 11	1411.51	(9 ⁺)	85.389	(7 ⁺)	Q	
1376.2 3	4.3 9	4437.81	(14 ⁺)	3061.71	(13 ⁺)	D	
1452.67 16	7.6 9	4437.81	(14 ⁺)	2985.09	(13 ⁺)	D	
1605.2 3	3.4 7	1817.87	(8 ⁻)	213.011	(7 ⁺)	D	
1615.3 6	4.1 7	3561.08	(12 ⁻)	1944.10	(11 ⁺)	D	
1621.2 4	5.6 8	3566.53	(12 ⁻)	1944.10	(11 ⁺)	D	
1685.6 4	12.0 11	3566.53	(12 ⁻)	1879.82	(11 ⁺)	D	

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(HI,xn γ) [1995Se08](#),[1993Jo07](#),[1998Ka54](#) (continued)

$\gamma(^{104}\text{In})$ (continued)

<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>
1732.72 <i>16</i>	8.7 <i>9</i>	1817.87	(8 ⁻)	85.389	(7 ⁺)	D
1891.9 <i>3</i>	3.3 <i>6</i>	3836.0	(12 ⁻)	1944.10	(11 ⁺)	D

[†] From [1995Se08](#).

[‡] Multiply placed with undivided intensity.

^x γ ray not placed in level scheme.

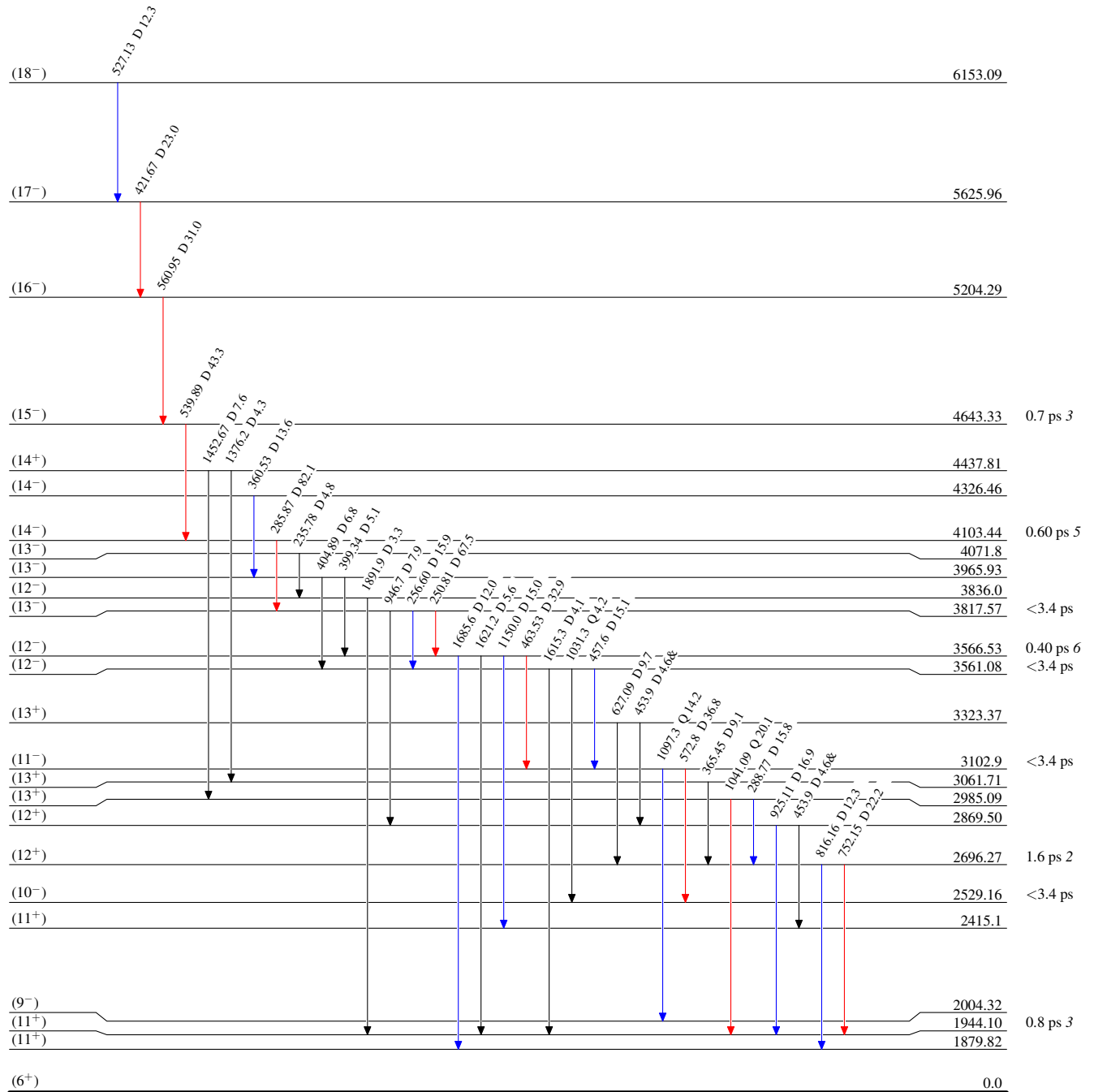
(HI,xn γ) 1995Se08,1993Jo07,1998Ka54

Level Scheme

Intensities: Relative I_γ
& Multiplied: undivided intensity given

Legend

— $I_\gamma < 2\% \times I_\gamma^{\max}$
 — $I_\gamma < 10\% \times I_\gamma^{\max}$
 — $I_\gamma > 10\% \times I_\gamma^{\max}$



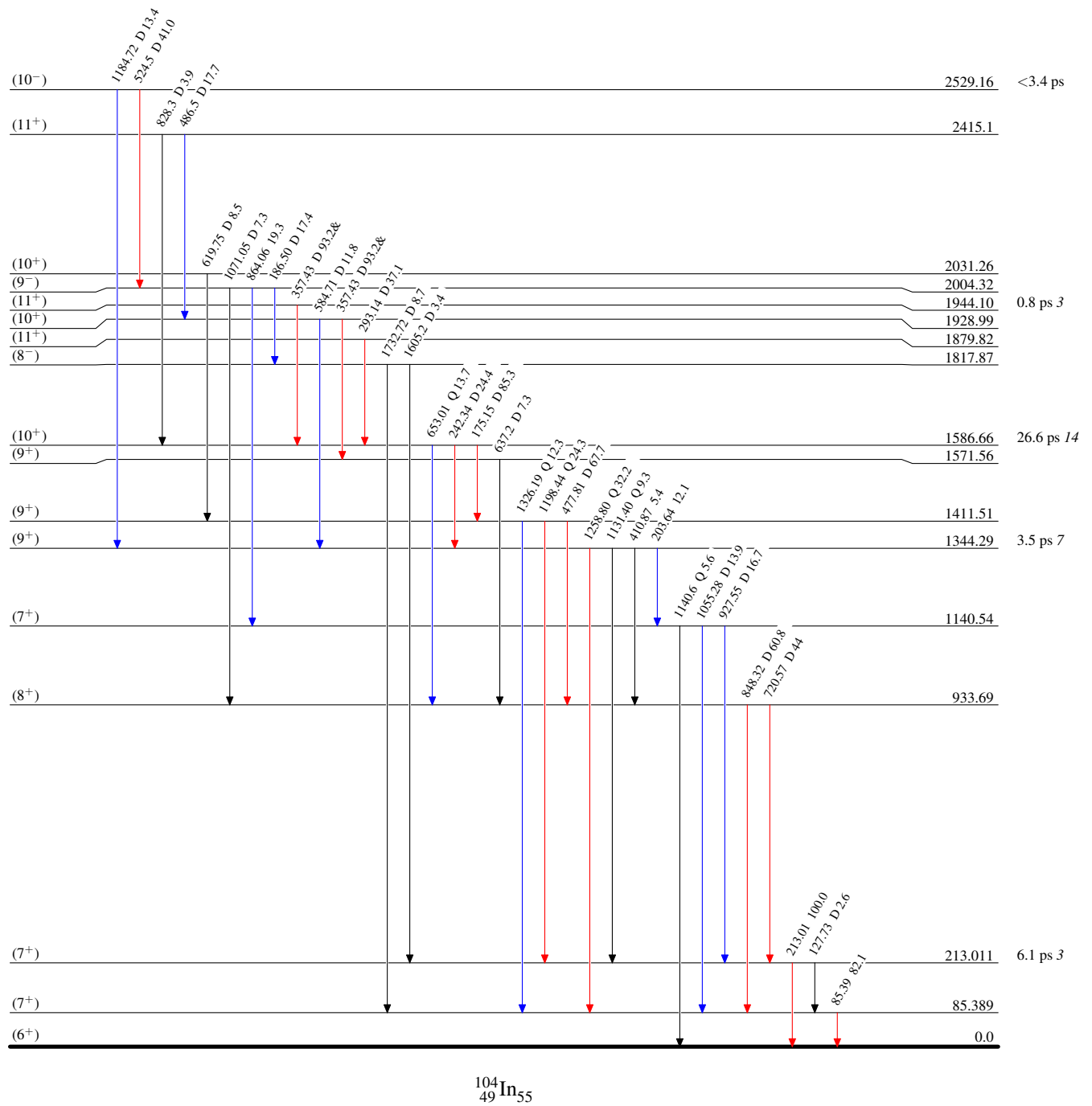
(HI,xn γ) 1995Se08,1993Jo07,1998Ka54

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

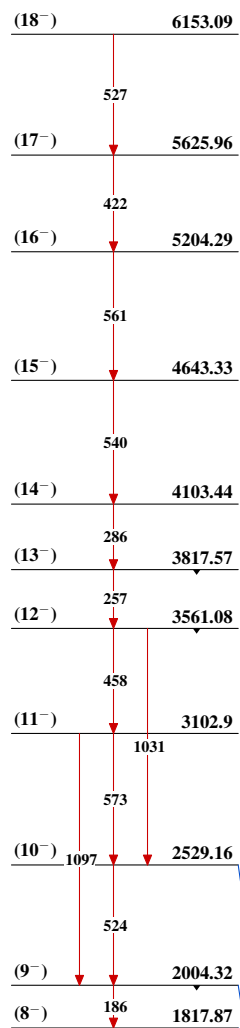
Legend

$\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$

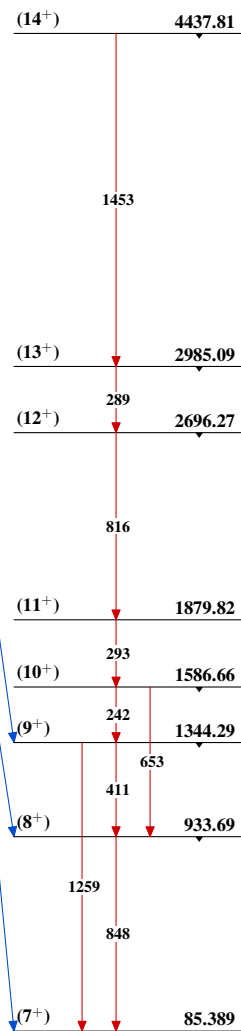


(HI,xn γ) 1995Se08,1993Jo07,1998Ka54

Band(A): Negative parity band



Band(B): Positive parity band



$^{104}_{49}\text{In}_{55}$