

⁸⁴As β⁻ decay (4.02 s) 1991Ho10

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni, M. Fadil, and B. Pfeiffer		NDS 110,2815 (2009)	30-Sep-2009

Parent: ⁸⁴As: E=0.0; J^π=(3⁻); T_{1/2}=4.02 s 3; Q(β⁻)=10094 4; %β⁻ decay=100.0

⁸⁴As-J^π: From ⁸⁴As Adopted Levels.

⁸⁴As-T_{1/2}: From 1993Ru01. Others: 3.16 s 58 (2013Ma22, from β-gated γ decay curve), 3.24 s 26 (1996WaZX), 4.5 s 2 (1991Om01), 5.3 s 4 (1975Kr08) and 5.8 s 5 (1968De19). Value from 1991Om01 is in agreement with that from 1993Ru01 but much less precise. All others seem in disagreement with the value from 1993Ru01. Weighted average of all the values is 4.03 s 8 with reduced χ²=7.9; value from LWM method is 4.14 s 27 with χ²=7.7. Unweighted average is 4.34 s 44. If the two highest values are omitted, weighted average is 4.02 s 7, χ²=5.6; LWM is 4.00 s 26, χ²=5.6; and unweighted average is 3.73 s 32.

⁸⁴As-Q(β⁻): from 2012Wa38.

⁸⁴As-%β⁻ decay: %β⁻=100, %β⁻n=0.18 10.

Additional information 1.

1991Ho10: measured γ, γγ.

Other: 1975Kr08.

For the decay scheme presented in this dataset, the average radiation energies are: <Eγ> =2840 keV 12, <Eβ⁻> =3.2×10³ keV 4, <Eν>=3.8×10³ keV 5. The sum of them is 9.8×10³ keV 6, which compares well with effective Q(β⁻)=10094 x 0.9982=10076 keV. The unplaced gamma rays are not included in <Eγ>; also, no multipolarities are known, therefore, conversion electrons, x-rays and Auger electron were not included.

⁸⁴Se Levels

E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]
0.0	0 ⁺	3232.45 15		4082.20 23		5869.38 24	
1454.45 9	(2 ⁺)	3297.26 11		4116.24 17		5890.0 4	(3 ⁻ , 1 ⁻)
2121.68 11	(4 ⁺)	3370.69 23		4282.20 11		6020.10 19	
2461.33 10	(1,2 ⁺)	3408.75 15		4445.21 23	(4 ⁺)	6249.60 25	
2699.52 12	(2,3,4)	3439.15 14		5161.20 19		6400.3 4	4 ⁺
2984.65 13	2 ⁺	3541.21 11	2 ⁺	5222.07 16		6541.4 4	
3024.27 12	(2 ⁺)	3548.3 4		5596.31 20	3 ⁻	6604.5 4	
3069.67 22		3872.04 15		5637.5 4			
3125.92 15		3985.30 23	2 ⁺	5661.58 23			

[†] From least-squares fit to Eγ.

[‡] From Adopted Levels.

β⁻ radiations

E(decay)	E(level)	Iβ ⁻ ^{†‡}	Log ft	Comments
(3490 4)	6604.5	0.89 11	6.04 6	av Eβ=1509.3 20
(3553 4)	6541.4	0.69 8	6.18 5	av Eβ=1539.6 20
(3694 4)	6400.3	1.35 15	5.96 5	av Eβ=1607.3 20
(3844 4)	6249.60	1.03 12	6.16 5	av Eβ=1679.7 20
(4074 4)	6020.10	1.87 19	6.01 5	av Eβ=1790.1 20
(4204 4)	5890.0	0.42 5	6.72 6	av Eβ=1852.8 20
(4225 4)	5869.38	1.12 9	6.30 4	av Eβ=1862.7 20
(4432 4)	5661.58	0.44 5	6.80 5	av Eβ=1963.0 20
(4457 4)	5637.5	0.41 5	6.84 6	av Eβ=1974.6 20
(4498 4)	5596.31	1.36 10	6.34 4	av Eβ=1994.5 20
(4872 4)	5222.07	1.48 15	6.46 5	av Eβ=2175.3 20
(4933 4)	5161.20	2.1 3	6.33 7	av Eβ=2204.7 20
(5649 4)	4445.21	0.52 6	7.20 5	av Eβ=2551.3 20

Continued on next page (footnotes at end of table)

⁸⁴As β⁻ decay (4.02 s) **1991Ho10** (continued)

β⁻ radiations (continued)

E(decay)	E(level)	Iβ ^{-†‡}	Log ft	Comments
(5812 4)	4282.20	4.7 3	6.30 3	av Eβ=2630.3 20
(5978 4)	4116.24	1.43 9	6.87 3	av Eβ=2710.7 20
(6012 4)	4082.20	0.44 5	7.40 5	av Eβ=2727.2 20
(6109 4)	3985.30	0.27 4	7.64 7	av Eβ=2774.1 20
(6222 4)	3872.04	2.02 16	6.80 4	av Eβ=2829.0 20
(6546 4)	3548.3	0.65 7	7.40 5	av Eβ=2986.0 20
(6553 4)	3541.21	5.1 7	6.50 6	av Eβ=2989.4 20
(6655 4)	3439.15	2.42 20	6.86 4	av Eβ=3038.9 20
(6685 4)	3408.75	1.21 18	7.17 7	av Eβ=3053.6 20
(6723 4)	3370.69	1.8 3	7.01 8	av Eβ=3072.1 20
(6797 4)	3297.26	1.2 6	7.2 2	av Eβ=3107.7 20
(6862 4)	3232.45	2.14 21	6.97 5	av Eβ=3139.1 20
(6968 4)	3125.92	0.80 12	7.43 7	av Eβ=3190.7 20
(7024 4)	3069.67	0.47 6	7.68 6	av Eβ=3218.0 20
(7070 4)	3024.27	1.77 16	7.11 4	av Eβ=3240.0 20
(7109 4)	2984.65	2.05 19	7.06 4	av Eβ=3259.2 20
(7394 4)	2699.52	10.1 9	6.45 4	av Eβ=3397.4 20
(7633 4)	2461.33	6.6 6	6.69 4	av Eβ=3512.8 20
(7972 4)	2121.68	11 3	6.6 1	av Eβ=3677.4 20
(8640 4)	1454.45	25 9	6.4 2	av Eβ=4000.5 20
(10094 4)	0.0	≤5	≥7.4	av Eβ=4703.9 20

† From γ intensity balance at each level. The sum of the β intensities is equal to 97% 10. The ground state intensity has been estimated as less than 5%.

‡ Absolute intensity per 100 decays.

γ(⁸⁴Se)

Iγ normalization: from **1991Om01**, authors determined %Iγ(667γ)=34 3, %Iγ(1455γ)=89 8 using calibrated β and γ detectors.
Other: 0.49 11 (**1990Ru05**).

E _γ	I _γ [#]	E _i (level)	J _i ^π	E _f	J _f ^π	Comments
325.03 10	0.10 3	3024.27	(2 ⁺)	2699.52	(2,3,4)	
426.4 2	0.2 1	3125.92		2699.52	(2,3,4)	
522.2 [†]	0.2 [†]	2984.65	2 ⁺	2461.33	(1,2 ⁺)	
573.9 [†]	0.4 [†]	3872.04		3297.26		
574.9 [†]	0.7 [†]	4116.24		3541.21	2 ⁺	
577.84 10	7.4 2	2699.52	(2,3,4)	2121.68	(4 ⁺)	
666.97 10	38 1	2121.68	(4 ⁺)	1454.45	(2 ⁺)	Eγ=666.7 7, Iγ=50 6 relative to 100 for 247.8 from ⁸⁴ Ga β ⁻ n decay (2009LeZZ).
741.23 10	2.4 2	4282.20		3541.21	2 ⁺	
985.20 10	1.47 5	4282.20		3297.26		
1007.12 10	2.6 1	2461.33	(1,2 ⁺)	1454.45	(2 ⁺)	
^x 1042.9 2	0.29 3					
1080.15 10	1.20 5	3541.21	2 ⁺	2461.33	(1,2 ⁺)	
1110.77 10	2.4 1	3232.45		2121.68	(4 ⁺)	
1175.9 2	0.60 [‡] 5	3297.26		2121.68	(4 ⁺)	
1245.3 2	6.3 4	2699.52	(2,3,4)	1454.45	(2 ⁺)	
1249.0 2	2.0 3	3370.69		2121.68	(4 ⁺)	
1287.06 10	1.76 6	3408.75		2121.68	(4 ⁺)	

Continued on next page (footnotes at end of table)

$^{84}\text{As} \beta^-$ decay (4.02 s) **1991Ho10** (continued) $\gamma(^{84}\text{Se})$ (continued)

E_γ	I_γ #	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
1317.45 10	2.2 1	3439.15		2121.68	(4 ⁺)	
1426.6 3	0.73 5	3548.3		2121.68	(4 ⁺)	
1454.55 10	100 2	1454.45	(2 ⁺)	0.0	0 ⁺	$E_\gamma=1455.3$ 7, $I_\gamma=83$ 9 relative to 100 for 247.8 from ^{84}Ga β^- n decay (2009LeZZ).
1530.19 10	2.1 1	2984.65	2 ⁺	1454.45	(2 ⁺)	
1569.53 10	1.89 5	3024.27	(2 ⁺)	1454.45	(2 ⁺)	
1615.2 2	0.53 4	3069.67		1454.45	(2 ⁺)	
^x 1618.8 2	0.47 4					
1671.45 15	0.70 5	3125.92		1454.45	(2 ⁺)	
1750.35 10	1.87 7	3872.04		2121.68	(4 ⁺)	
1843.13 10	6.1 2	3297.26		1454.45	(2 ⁺)	
1863.6 2	0.30 3	3985.30	2 ⁺	2121.68	(4 ⁺)	
1925.5 2	0.70 5	5222.07		3297.26		
^x 1951.6 2	0.65 4					
^x 1956.2 2	0.57 4					
1960.5 2	0.49 4	4082.20		2121.68	(4 ⁺)	
^x 1973.5 2	0.46 4					
1984.7 2	0.52 3	3439.15		1454.45	(2 ⁺)	
2086.69 10	7.6 3	3541.21	2 ⁺	1454.45	(2 ⁺)	
2159.0 2	0.76 5	4282.20		2121.68	(4 ⁺)	
^x 2237.9 2	0.72 5					
2299.0 2	0.70 5	5596.31	3 ⁻	3297.26		
2323.5 2	0.58 4	4445.21	(4 ⁺)	2121.68	(4 ⁺)	
^x 2418.1 2	0.86 5					
2461.35 15	6.2 3	2461.33	(1,2 ⁺)	0.0	0 ⁺	
2522.10 15	0.96 5	5222.07		2699.52	(2,3,4)	
^x 2535.22 15	0.95 5					
^x 2596.5 2	0.52 4					
^x 2612.3 2	0.37 4					
2661.74 15	0.91 5	4116.24		1454.45	(2 ⁺)	
2722.80 15	2.1 1	6020.10		3297.26		
2840.8 2	0.4 1	6249.60		3408.75		
2962.0 2	0.49 4	5661.58		2699.52	(2,3,4)	
3039.46 15	2.4 2	5161.20		2121.68	(4 ⁺)	
^x 3154.8 2	0.51 3					
3169.4 3	0.65 4	5869.38		2699.52	(2,3,4)	
3474.6 3	0.78 5	5596.31	3 ⁻	2121.68	(4 ⁺)	
3748.0 3	0.61 4	5869.38		2121.68	(4 ⁺)	
^x 4069.0 3	0.52 4					
^x 4108.9 4	0.49 4					
4127.9 3	0.76 5	6249.60		2121.68	(4 ⁺)	
4182.9 3	0.46 4	5637.5		1454.45	(2 ⁺)	
4280.9 3	0.67 4	4282.20		0.0	0 ⁺	
4435.4 3	0.47 4	5890.0	(3 ⁻ ,1 ⁻)	1454.45	(2 ⁺)	
^x 4575.7 3	0.62 4					
^x 4637.0 3	0.45 4					
^x 4769.5 3	0.43 4					
^x 4795.0 3	0.55 4					
^x 4821.1 3	0.44 4					
^x 4888.3 3	0.38 4					
4945.7 3	1.52 10	6400.3	4 ⁺	1454.45	(2 ⁺)	
^x 5020.3 3	0.39 4					
5086.8 3	0.77 6	6541.4		1454.45	(2 ⁺)	
5149.9 3	1.00 8	6604.5		1454.45	(2 ⁺)	

Continued on next page (footnotes at end of table)

${}^{84}\text{As}$ β^- decay (4.02 s) **1991Ho10** (continued)

$\gamma({}^{84}\text{Se})$ (continued)

† From authors' decay scheme, not given in their table.

‡ $I\gamma=0.60\ 50$ given by the authors is perhaps a typo.

For absolute intensity per 100 decays, multiply by 0.89 8.

^x γ ray not placed in level scheme.

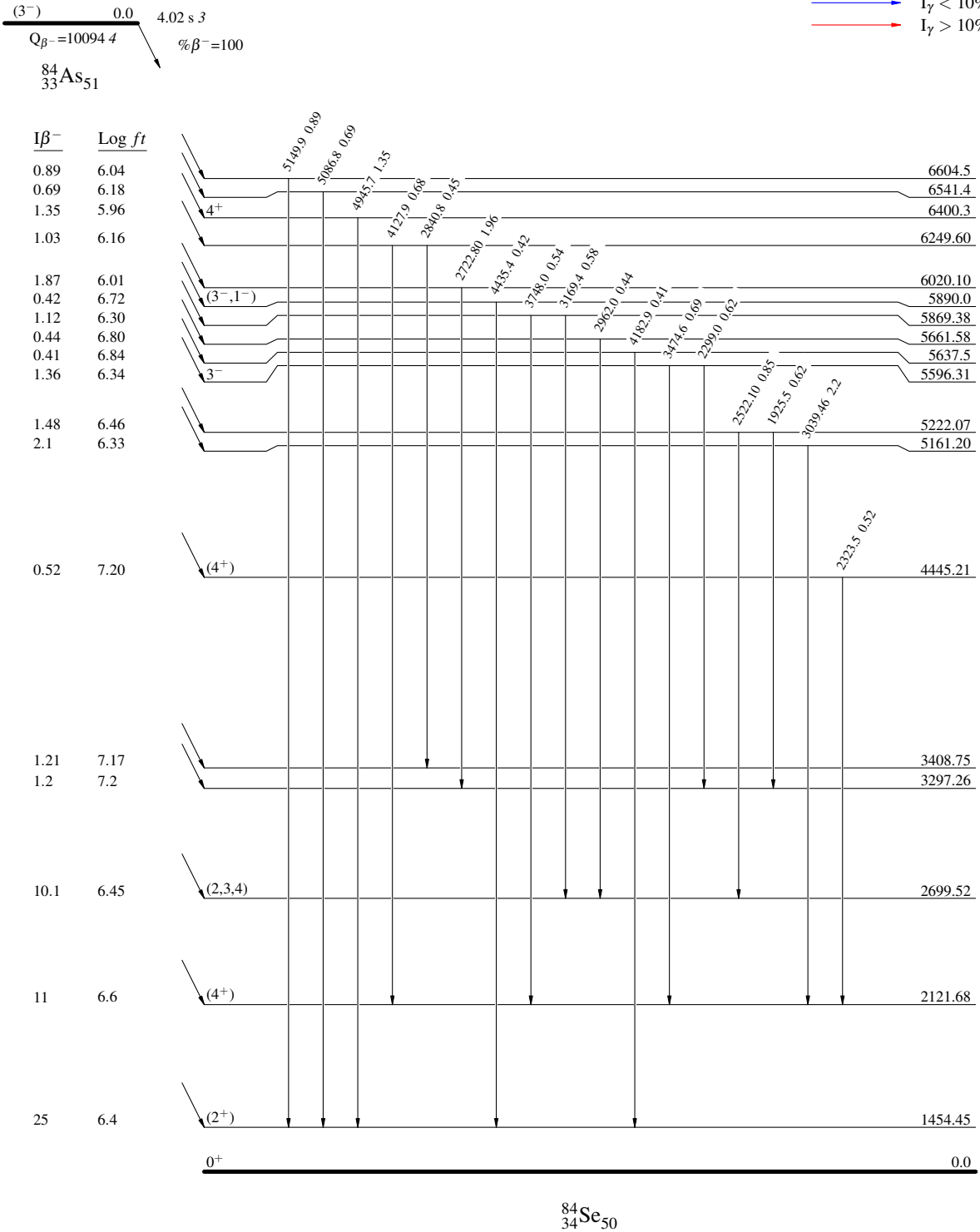
^{84}As β^- decay (4.02 s) **1991Ho10**

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

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






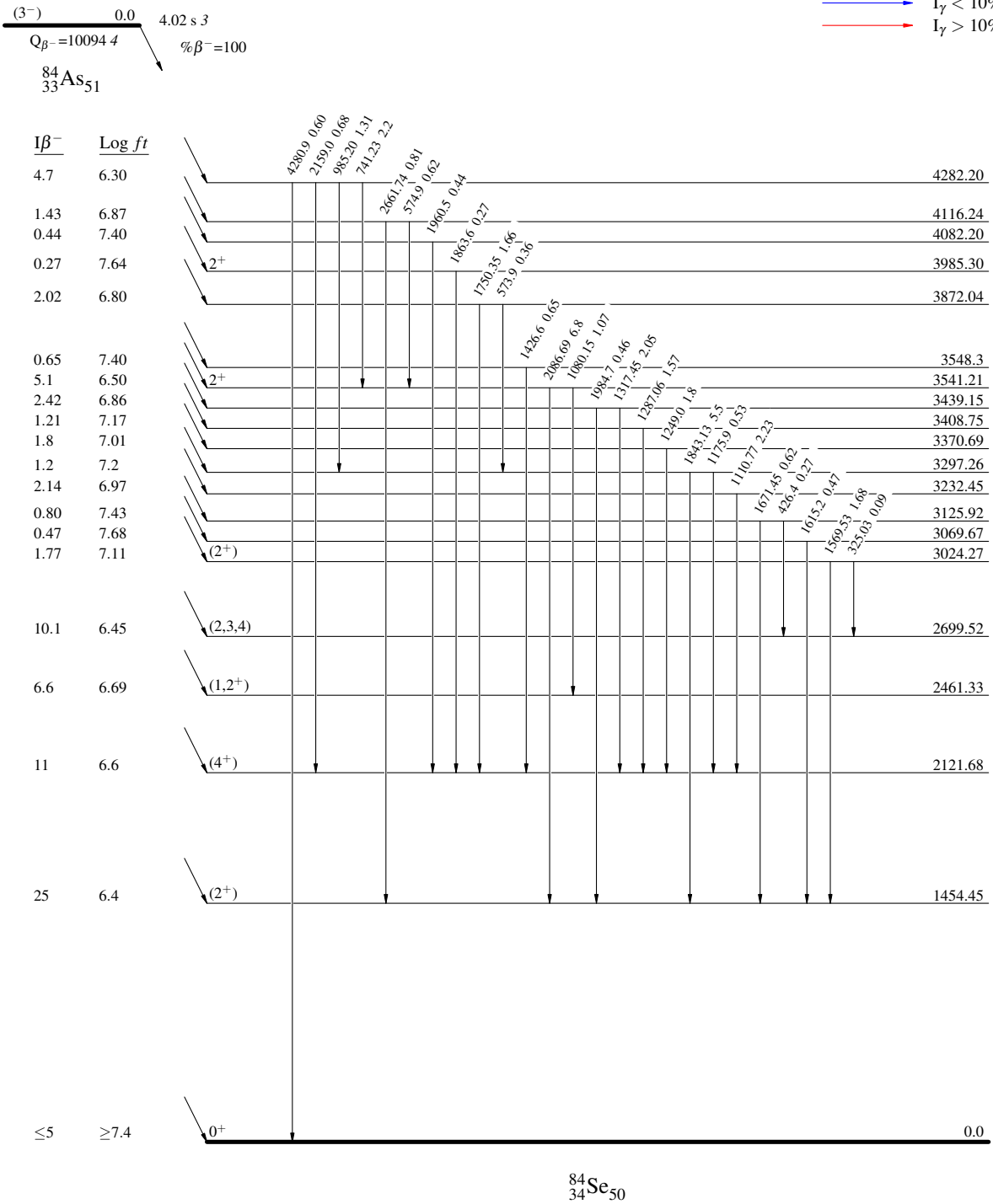
$^{84}\text{As} \beta^-$ decay (4.02 s) $^{199}\text{Ho}_{10}$

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

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



^{84}As β^- decay (4.02 s) 1991Ho10

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

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

