

$^{134}\text{Ba}(\text{n},\text{n}'\gamma)$ **1992Fa09,1995De64**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 103, 1 (2004)	31-Jul-2004

1992Fa09: E=2-3 MeV, pulsed neutron beam from $^3\text{H}(\text{p},\text{n})$ reaction, measured $E\gamma$, $\gamma(\theta)$, doppler shift.

1995De64: fast neutrons from reactor, measured $E\gamma$, $\gamma(\theta)$, polarization.

Others: **1991Be46**, **1988Mo03**.

 ^{134}Ba Levels

E(level) [†]	J π [‡]	T _{1/2} [#]	E(level) [†]	J π [‡]
0.0	0 ⁺	stable	2574.30 10	(2 ⁺)
604.710 6	2 ⁺		2599.97 7	2 ⁺
1167.958 6	2 ⁺		2656.14 10	(2 ⁺)
1400.652 9	4 ⁺		2661.84 5	3 to 5
1643.296 8	3 ⁺		2677.74 8	3,4
1760.572 11	0 ⁺		2696.42 9	1,2
1969.983 12	4 ⁺		2729.23 20	1,2 ⁺
1986.06 5	5 ⁻		2747.29 17	2 ⁺
2029.244 8	2 ⁺	0.159 ps 16	2760.61 10	1,2
2088.266 11	2 ⁺	0.059 ps 5	2773.80 9	3,4
2118.251 12	(4 ⁺)		2823.72 11	1
2159.690 21	(0 ⁺)	0.104 ps +28-21	2836.31 21	(8 ⁺)
2164.621 12	(4 ⁺)		2851.45 17	2 ⁺
2211.514 22	(6 ⁺)		2876.85 10	3 to 5
2244.95 5			2917.78 13	2
2254.66 3	3 ⁻		2925.95 15	3 to 5
2271.20 7	7 ⁻		2938.8 3	1 ⁺
2279.91 3	(2,3)		2943.89 14	2 to 4
2285.35 4	(5 ⁺)		2950.54 24	3,4
2300.4 3	(6 ⁺)		3027.22 19	(1 ⁺)
2335.22 7	1,2 ⁺	0.21 ps +10-6	3061.12? 17	2 ⁽⁺⁾
2336.852 12	0 ⁺	0.097 ps +28-21	3086.28 18	1 ⁺ ,2 ⁺
2371.01 7	2 ⁺	0.46 ps +21-12	3160.06 19	1,2 ⁺
2377.12 9	(6)		3245.5 9	(1 ⁺)
2379.062 21	0 ⁺		3261.9 3	2 to 4
2464.27 6	(2 ⁺)		3314.60 18	2,3
2469.56 6	(5 ⁺)		3326.3? 5	(1 ⁺)
2480.32 5	(2,3)		3369.0? 5	1,2
2487.32 5	0 ⁺	0.13 ps +9-4	3371.78 20	2 to 4
2506.33 4	(4 ⁺)	0.15 ps +23-7	3408.3 6	1,2
2530.99 8	(5 ⁻ to 7 ⁻)		3443.38 20	2 to 4
2537.09 8	0 to 2	0.15 ps +19-6	3451.0 4	1,2 ⁺
2564.64 9	1 ⁺ ,2 ⁺	0.06 ps +12-4	3684.2 4	2 ⁺
2570.878 8	1 ⁽⁺⁾		3853.8 4	2 ⁺

[†] From least-squares fit to $E\gamma$.

[‡] From Adopted Levels.

[#] From DSAM (**1992Fa09**).

$\gamma(^{134}\text{Ba})$									
E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α^a	Comments
132.4 & 8	6.7 21	2377.12	(6)	2244.95					
165.7 & 8	6.4 15	2377.12	(6)	2211.514	(6 ⁺)				
194.66 & 6	22.0 14	2164.621	(4 ⁺)	1969.983	4 ⁺				
225.7 & b 3	4.4 8	2211.514	(6 ⁺)	1986.06	5 ⁻				E_γ : The level assignment is not sure, this γ -ray could also decay from the 2480 level.
242.69 10	1.94 25	1643.296	3 ⁺	1400.652	4 ⁺				
259.70 & 12	48 7	2530.99	(5 ⁻ to 7 ⁻)	2271.20	7 ⁻				
285.12 & 6	100	2271.20	7 ⁻	1986.06	5 ⁻				
309.88 & 6	72 5	2279.91	(2,3)	1969.983	4 ⁺				
315.54 & 12	18.0 18	2285.35	(5) ⁺	1969.983	4 ⁺				
391.06 7	100 5	2377.12	(6)	1986.06	5 ⁻				
475.338 9	100.0 5	1643.296	3 ⁺	1167.958	2 ⁺	M1+E2	+16 3		$\alpha(\text{K})=0.00955$; $\alpha(\text{L})=0.00146$; $\alpha(\text{M})=0.00030$ Mult.: from 1995De64 . Other: -11 +2-5 (1992Fa09).
521.22 & 15	8.2 8	2164.621	(4 ⁺)	1643.296	3 ⁺				
544.7 3	49 6	2574.30	(2 ⁺)	2029.244	2 ⁺				
544.97 & 7	100 5	2530.99	(5 ⁻ to 7 ⁻)	1986.06	5 ⁻				
563.232 10	100.0 2	1167.958	2 ⁺	604.710	2 ⁺	M1+E2	+6.2 @ 6		
569.316 10	100.0 5	1969.983	4 ⁺	1400.652	4 ⁺	M1+E2	+0.29 +12-5		$\alpha(\text{K})=0.00832$; $\alpha(\text{L})=0.00106$ Mult.: from 1995De64 . Other: +0.03 7 (1992Fa09).
585.43 9	100	1986.06	5 ⁻	1400.652	4 ⁺	E1(+M2)	+0.1 2	0.0025 19	$\alpha(\text{K})=0.0022$ 16; $\alpha(\text{L})=0.00027$ 22
592.575 13	100.8 8	1760.572	0 ⁺	1167.958	2 ⁺				
601.65 & 5	100	2244.95		1643.296	3 ⁺				
604.709 7	100	604.710	2 ⁺	0.0	0 ⁺	E2 [#]			
624.8 & 2	100	2836.31	(8 ⁺)	2211.514	(6 ⁺)				
642.01 & 5	100 4	2285.35	(5) ⁺	1643.296	3 ⁺	E2			
648.4 & 3	12 2	2677.74	3,4	2029.244	2 ⁺				
717.604 8	100.0 7	2118.251	(4 ⁺)	1400.652	4 ⁺	M1+E2 [#]	-0.21 @ 2		
728.2 5	7.8 6	2371.01	2 ⁺	1643.296	3 ⁺				
744.73 & 15	61 5	2773.80	3,4	2029.244	2 ⁺				
764.02 3	57.7 14	2164.621	(4 ⁺)	1400.652	4 ⁺				
775.8 & b 3	28 3	2537.09	0 to 2	1760.572	0 ⁺				
795.942 8	100	1400.652	4 ⁺	604.710	2 ⁺				
802.10 3	59.0 5	1969.983	4 ⁺	1167.958	2 ⁺				
810.86 2	100	2211.514	(6 ⁺)	1400.652	4 ⁺				
826.28 6	100 5	2469.56	(5) ⁺	1643.296	3 ⁺	E2			
843.91 & 5	100 10	2487.32	0 ⁺	1643.296	3 ⁺				
861.286 10	2.6 3	2029.244	2 ⁺	1167.958	2 ⁺				
879.30 3	59.1 16	2279.91	(2,3)	1400.652	4 ⁺				

$^{134}\text{Ba}(n,n'\gamma)$ **1992Fa09,1995De64** (continued) $\gamma(^{134}\text{Ba})$ (continued)

E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α^a	Comments
884.72 & 6	39.8 20	2285.35	(5) ⁺	1400.652	4 ⁺				
899.7 3	100	2300.4	(6 ⁺)	1400.652	4 ⁺				
920.31 2	11.8 5	2088.266	2 ⁺	1167.958	2 ⁺	M1+E2	+0.14 8		Mult.: from 1995De64. Other: +0.01 12 or +2.2 +12-7 (1992Fa09).
950.21 3	19.6 7	2118.251	(4 ⁺)	1167.958	2 ⁺				
996.649 12	100.0 14	2164.621	(4 ⁺)	1167.958	2 ⁺				
1018.54 & 5	100	2661.84	3 to 5	1643.296	3 ⁺				
1038.571 10	66.7 5	1643.296	3 ⁺	604.710	2 ⁺	M1+E2	+1.11 5		$\alpha(\text{K})=0.00177$ 4; $\alpha(\text{L})=0.00022$ Mult.: from 1995De64. Other: +0.83 11 (1992Fa09).
1068.76 16	33.8 23	2469.56	(5) ⁺	1400.652	4 ⁺				
1086.71 3	19.5 6	2254.66	3 ⁻	1167.958	2 ⁺	E1(+M2)	-0.08 7	0.00068 7	$\alpha(\text{K})=0.00059$ 6
1105.68 4	100 3	2506.33	(4 ⁺)	1400.652	4 ⁺	(M1+E2)			δ : -0.21 11 or +1.5 5 from $\gamma(\theta)$.
1111.70 10	39.3 16	2279.91	(2,3)	1167.958	2 ⁺				Mult.: +0.24 5 or +18 +24-8 (1995De64).
1155.894 13	87.3 8	1760.572	0 ⁺	604.710	2 ⁺				
1167.942 7	21.4 2	1167.958	2 ⁺	0.0	0 ⁺	E2 [#]			
1211.10 2	100 4	2379.062	0 ⁺	1167.958	2 ⁺				
1233.55 & 10	100	2876.85	3 to 5	1643.296	3 ⁺				
1255.3 & 2	34 4	2656.14	(2 ⁺)	1400.652	4 ⁺				
1282.65 & 15	100	2925.95	3 to 5	1643.296	3 ⁺				
1307.6 & 4	52 8	2950.54	3,4	1643.296	3 ⁺				
1320.11 13	69 7	2487.32	0 ⁺	1167.958	2 ⁺				
1339.2 & 4	21.7 23	2506.33	(4 ⁺)	1167.958	2 ⁺				
1347.0 & 3	46 4	2747.29	2 ⁺	1400.652	4 ⁺				
1365.32 3	20.0 8	1969.983	4 ⁺	604.710	2 ⁺				I_γ : from 1995De64.
1369.15 8	85 4	2537.09	0 to 2	1167.958	2 ⁺				
1373.2 & 7	20 5	2773.80	3,4	1400.652	4 ⁺				
1381.33 & 5	14.5 6	1986.06	5 ⁻	604.710	2 ⁺				
1396.9 2	35 3	2564.64	1 ⁺ ,2 ⁺	1167.958	2 ⁺				
1402.890 10	73 4	2570.878	1 ⁽⁺⁾	1167.958	2 ⁺				
1406.4 5	67 6	2574.30	(2 ⁺)	1167.958	2 ⁺				
1424.523 8	100.0 5	2029.244	2 ⁺	604.710	2 ⁺	M1+E2	-0.253 13	0.00112	$\alpha(\text{K})=0.00096$; $\alpha(\text{L})=0.00012$ Mult.: from 1995De64. Other: -0.31 5 (1992Fa09).
1443.1 & 2	100 8	3086.28	1 ⁺ ,2 ⁺	1643.296	3 ⁺				
1483.549 10	100.0 6	2088.266	2 ⁺	604.710	2 ⁺	M1+E2	+0.10 2	0.00104	$\alpha(\text{K})=0.00090$; $\alpha(\text{L})=0.00011$ Mult.: from 1995De64. Other: +0.02 5 (1992Fa09).
1488.26 & 13	65 4	2656.14	(2 ⁺)	1167.958	2 ⁺				
1517.3 & 2	≤150	2917.78	2	1400.652	4 ⁺				
1528.8 & 2	42 10	2696.42	1,2	1167.958	2 ⁺				
1554.97 2	100	2159.690	(0) ⁺	604.710	2 ⁺	E2			
1649.84 7	100.0 6	2254.66	3 ⁻	604.710	2 ⁺	E1(+M2)	-0.01 3		

$^{134}\text{Ba}(n,n'\gamma)$ 1992Fa09,1995De64 (continued)

$\gamma(^{134}\text{Ba})$ (continued)								
E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	$\delta^\ddagger$	Comments
1660.8 $\&$ 3	39 5	3061.12?	2 ⁽⁺⁾	1400.652	4 ⁺			
1675.10 12	100.0 18	2279.91	(2,3)	604.710	2 ⁺			
1683.48 $\&$ 18	100 5	2851.45	2 ⁺	1167.958	2 ⁺			
1730.53 7	100 4	2335.22	1,2 ⁺	604.710	2 ⁺	M1+E2		δ : -0.25 2 or +6.3 +10-7 (1995De64).
1732.129 10	100	2336.852	0 ⁺	604.710	2 ⁺	E2		
1749.5 $\&$ 3	100 10	2917.78	2	1167.958	2 ⁺			
1766.28 7	100.0 11	2371.01	2 ⁺	604.710	2 ⁺	M1+E2		δ : : -0.80 +10-16 or -5.5 +9-14 from $\gamma(\theta)$.
1774.1 2	32 4	2379.062	0 ⁺	604.710	2 ⁺			
1859.58 6	100.2 9	2464.27	(2 ⁺)	604.710	2 ⁺	M1+E2 $^\#$	+0.62 +12-19	
1875.60 5	100	2480.32	(2,3)	604.710	2 ⁺			
1882.7 2	49 3	2487.32	0 ⁺	604.710	2 ⁺			
1893.0 $\&$ 2	100 6	3061.12?	2 ⁽⁺⁾	1167.958	2 ⁺			
1901.2 2	54 3	2506.33	(4 ⁺)	604.710	2 ⁺			
1913.8 $\&$ 2		3314.60	2,3	1400.652	4 ⁺			E_γ : contaminated with ^{135}Ba contribution.
1917.8 $\&$ 4	86 10	3086.28	1 ⁺ ,2 ⁺	1167.958	2 ⁺			
1932.2 2	100 4	2537.09	0 to 2	604.710	2 ⁺			
1959.87 9	100 3	2564.64	1 ⁺ ,2 ⁺	604.710	2 ⁺			
1965.8 $\&$ 4	33 2	2570.878	1 ⁽⁺⁾	604.710	2 ⁺			
1969.65 11	85 6	2574.30	(2 ⁺)	604.710	2 ⁺			
1992.1 $\&$ 2	100 8	3160.06	1,2 ⁺	1167.958	2 ⁺			
1995.24 7	100	2599.97	2 ⁺	604.710	2 ⁺	M1+E2		δ : -0.17 +9-7 or +4.1 +16-10 from $\gamma(\theta)$.
2029.26 10	21.2 10	2029.244	2 ⁺	0.0	0 ⁺	E2		
2051.4 2	100	2656.14	(2 ⁺)	604.710	2 ⁺	(M1+E2)	-0.4 3	
2073.02 8	100 2	2677.74	3,4	604.710	2 ⁺			
2088.15 7	37.4 5	2088.266	2 ⁺	0.0	0 ⁺	E2		
2091.62 10	100	2696.42	1,2	604.710	2 ⁺			
2124.5 2	100	2729.23	1,2 ⁺	604.710	2 ⁺			
2142.4 2	100	2747.29	2 ⁺	604.710	2 ⁺	M1+E2		δ : +0.4 +14-2 or +1.1 +5-9 from $\gamma(\theta)$.
2155.88 10	100	2760.61	1,2	604.710	2 ⁺			
2168.99 10	100	2773.80	3,4	604.710	2 ⁺			
2203.8 $\&$ 2	100	3371.78	2 to 4	1167.958	2 ⁺			
2275.4 $\&$ 2	100	3443.38	2 to 4	1167.958	2 ⁺			
2283.0 $\&$ 4	100 10	3451.0	1,2 ⁺	1167.958	2 ⁺			
2313.0 $\&$ 2	70 13	2917.78	2	604.710	2 ⁺			
2334.5 $\&$ 3	15.5 11	2335.22	1,2 ⁺	0.0	0 ⁺	E2		
2339.16 $\&$ 14	100	2943.89	2 to 4	604.710	2 ⁺			
2345.6 $\&$ 3	100 8	2950.54	3,4	604.710	2 ⁺			
2371.0 5	12.9 9	2371.01	2 ⁺	0.0	0 ⁺	E2		
2422.4 $\&$ 6	46 6	3027.22	(1 ⁺)	604.710	2 ⁺			

¹³⁴Ba(n,n'γ) 1992Fa09,1995De64 (continued)

γ(¹³⁴Ba) (continued)

E _γ	I _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]	E _γ	I _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]
2464.15 10	16.2 9	2464.27	(2 ⁺)	0.0	0 ⁺	E2 [#]	2851.4& 4	41 5	2851.45	2 ⁺	0.0	0 ⁺	E2
2570.875 10	100 4	2570.878	1 ⁽⁺⁾	0.0	0 ⁺	(M1)	2938.8& 3	100	2938.8	1 ⁺	0.0	0 ⁺	
2573.7 5	100 9	2574.30	(2 ⁺)	0.0	0 ⁺	E2 [#]	3027.2& 2	100 7	3027.22	(1 ⁺)	0.0	0 ⁺	
2657.2& 3	100	3261.9	2 to 4	604.710	2 ⁺		3159.9& 6	34 5	3160.06	1,2 ⁺	0.0	0 ⁺	
2696.1& 5	34 5	2696.42	1,2	0.0	0 ⁺		3245.5& 9	100	3245.5	(1 ⁺)	0.0	0 ⁺	
2710.4& 4	100	3314.60	2,3	604.710	2 ⁺		3326.2& 6	100 15	3326.3?	(1 ⁺)	0.0	0 ⁺	
2721.7& 9	67 18	3326.3?	(1 ⁺)	604.710	2 ⁺		3408.1& 8	100 45	3408.3	1,2	0.0	0 ⁺	
2764.3& 5	100	3369.0?	1,2	604.710	2 ⁺		3451.4& 11	52 10	3451.0	1,2 ⁺	0.0	0 ⁺	
2803.6& 7	90 25	3408.3	1,2	604.710	2 ⁺		3684.1& 4	100	3684.2	2 ⁺	0.0	0 ⁺	E2
2823.69 11	100	2823.72	1	0.0	0 ⁺		3853.7& 4	100	3853.8	2 ⁺	0.0	0 ⁺	E2

[†] Relative photon branching ratio.

[‡] From γ(θ).

[#] From 1995De64.

[@] From 1995De64.

& γ-ray seen by 1995De64 only.

^a 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.

^b Placement of transition in the level scheme is uncertain.

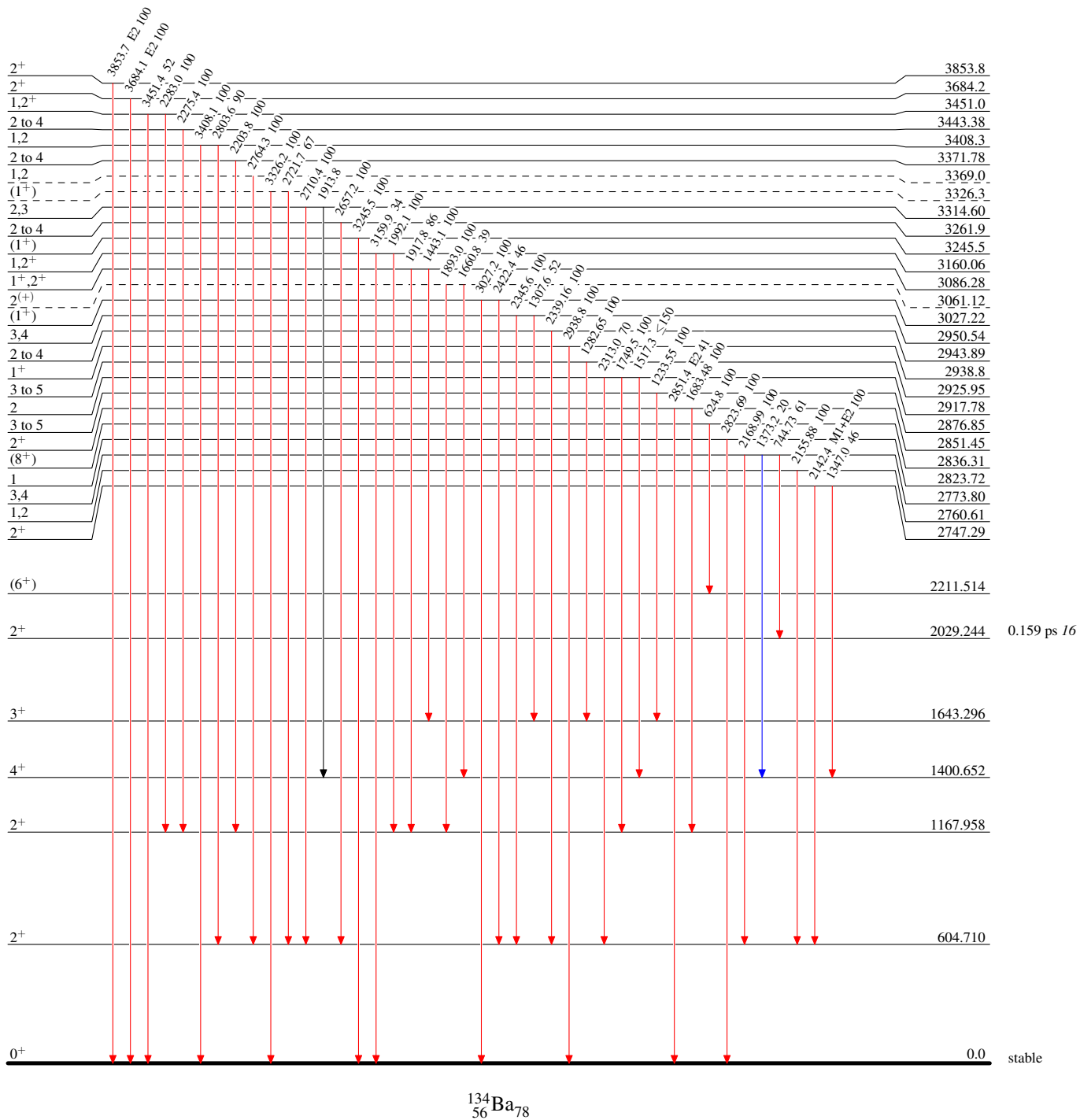
$^{134}\text{Ba}(n,n'\gamma)$ 1992Fa09,1995De64

Level Scheme

Intensities: Type not specified

Legend

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



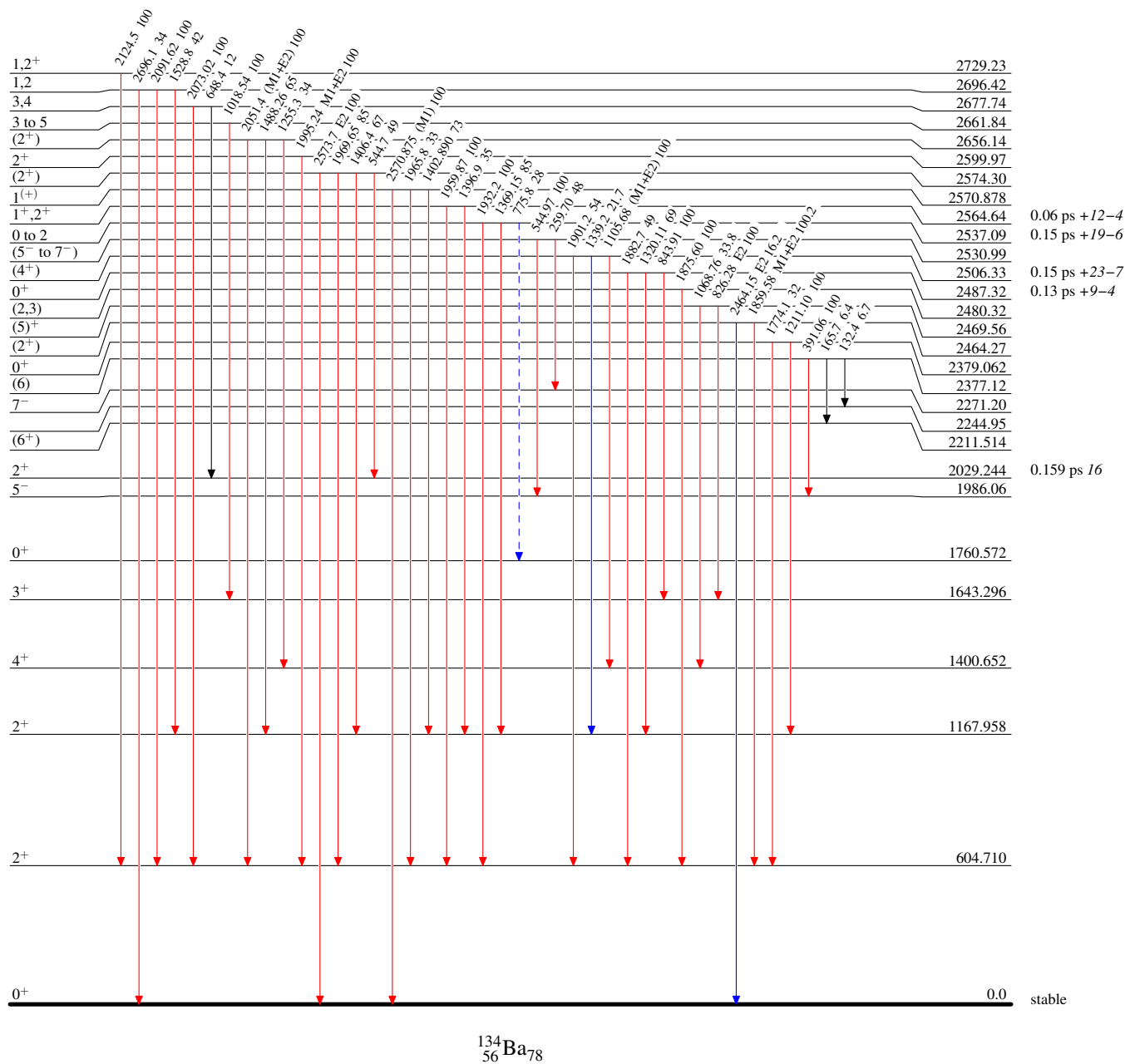
$^{134}\text{Ba}(n,n'\gamma)$ 1992Fa09,1995De64

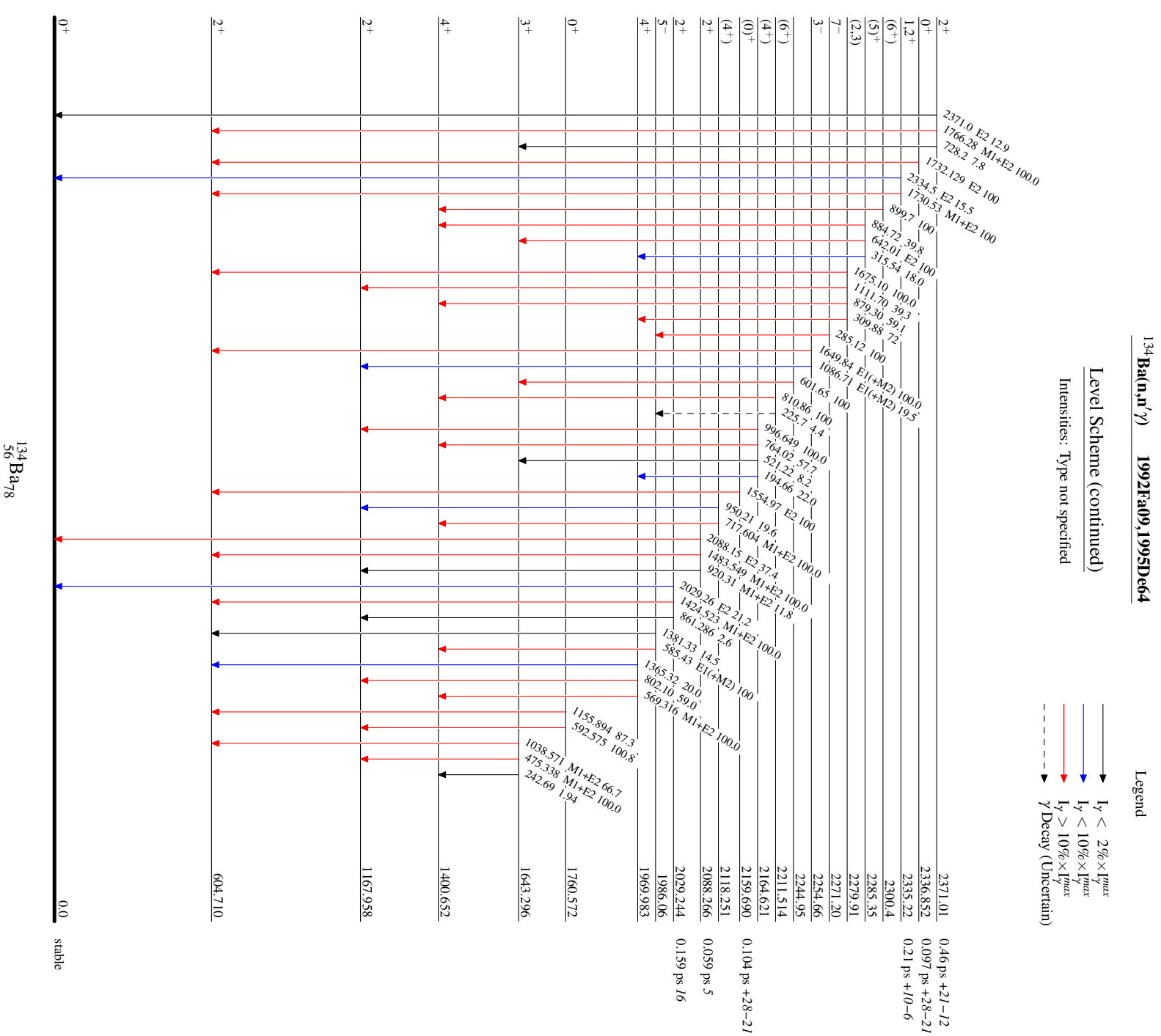
Legend

Level Scheme (continued)

Intensities: Type not specified

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ γ Decay (Uncertain)





$^{134}\text{Ba}(\text{n},\text{n}'\gamma)$ 1992Fa09,1995De64

Level Scheme (continued)

Intensities: Type not specified

Legend

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

