^{138}Ba(α,2nγ) 1984En01,1986En06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

E(α)=20-27 MeV (1984En01), 32 MeV (1979BiZN), 20 MeV (1978CeZZ).
Measured: γ, $\gamma\gamma$, $\gamma(\theta)$, γ(t), exit (1984En01,1984Ko17,1979BiZN,1978CeZZ,1970Sm05), linear pol of γ (1984En01), ce (1979BiZN,1978CeZZ), γ(t)(1985PrZY).
The decay scheme is from 1986En06.

^{140}Ce Levels

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	Comments
0.0	0^+		
1596.2	2^+		
1903.2	0^+	0.40 ns *3*	$T_{1/2}$: from 1984Ju01.
2083.1	4^+	3.7 ns *2*	$T_{1/2}$: from 1985PrZY. Other: 4 ns *1* (1970Sm05).
2107.7	6^+	7.3 μs *15*	$T_{1/2}$: from 1969Iv02.
2347.7	2^+		
2349.7	5^+		
2411.9	3^+		
2463.8	3^-		
2481.1	4^+		
2515.5	3^+,4^+		
2521.4	2^+		
2628.5	6^+		
2658.1?[#]			
3168.1?[#]			
3255.3	5^-		
3391[#]			
3395.0[#]	4^+		
3424.4	7^-		
3432.7[#]	7^+		
3476.7	8^-		
3484.1	6^+		
3492.8	9^-	1.7 ns *2*	$T_{1/2}$: from 1984En01, 1985PrZY.
3512.6	8^+		
3522.4? *16*	(5)		
3534.5?	(3,4)		
3620.7	8^+		
3661.2	(7,8)		
3715.0	10^+	23.1 ns *4*	g=+1.03 *4* (1988Ka04) $T_{1/2}$: from 1984En01. Others: 26 ns *2* (1979BiZN), 27 ns *3* (1985PrZY), 22 ns *2* (1970Sm05). Other: g=+0.75 *5* (1984En01). g: From $\gamma(\theta$,H,t).
3895.0	9^+		
3970.7?			
4263.2	10^+		
4449.2	(9,11)		
4571.0?	(8^+,10^+)		
4852.0	12^+		
4905.0	11^-		
4958.6	(11^+)		
5070.2	(9,11)		
5093.9	(12^-)		

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^{138}Ba(α,2nγ) 1984En01,1986En06 (continued)

^{140}Ce Levels (continued)

E(level)[†]	J$^\pi$[‡]
5103.3	13$^-$
5336.0	(12$^-$)

[†] From least-squares fit to γ energies (with $\Delta E\gamma$=1 keV).
[‡] From 1984En01, 1979BiZN.
[#] From 1979BiZN, 1978CeZZ.

γ(^{140}Ce)

Quantitative data on Iγ, $\gamma(\theta)$, α(K)exp, linear pol reported in 1984En01, 1979BiZN, 1978CeZZ are not given explicitly by the authors.

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	Comments
15.7		3492.8	9$^-$	3476.7	8$^-$		
(24.5)		2107.7	6$^+$	2083.1	4$^+$		
51.8		3476.7	8$^-$	3424.4	7$^-$		
69.0		2481.1	4$^+$	2411.9	3$^+$		
69.5[‡]		3492.8	9$^-$	3424.4	7$^-$		
131.1		2481.1	4$^+$	2349.7	5$^+$	M1,E2	
135.3		5093.9	(12$^-$)	4958.6	(11$^+$)		
180.0		3895.0	9$^+$	3715.0	10$^+$		Mult.: E1 from α(K)exp (1979BiZN) is in disagreement with ΔJ=1, $\Delta\pi$=no as deduced from J^π's assigned by 1984En01.
188.8		5093.9	(12$^-$)	4905.0	11$^-$		
202.3	4 *1*	3715.0	10$^+$	3512.6	8$^+$	E2	Mult.: A$_2$=+0.23 *4*, A$_4$=+0.09 *6* (1970Sm05). I$_\gamma$: from 1970Sm05.
222.4	11 *2*	3715.0	10$^+$	3492.8	9$^-$	E1	Mult.: A$_2$=−0.13, A$_4$=−0.04 *4* (1970Sm05). I$_\gamma$: from 1970Sm05.
232.6		5336.0	(12$^-$)	5103.3	13$^-$		
242.0		2349.7	5$^+$	2107.7	6$^+$	M1,E2	
251.2		5103.3	13$^-$	4852.0	12$^+$	E1	
266.5		2349.7	5$^+$	2083.1	4$^+$	M1,E2	
274.2		3895.0	9$^+$	3620.7	8$^+$		
278.9		2628.5	6$^+$	2349.7	5$^+$	M1,E2	
307.0		1903.2	0$^+$	1596.2	2$^+$		
328.7		2411.9	3$^+$	2083.1	4$^+$	M1,E2	
368.1		4263.2	10$^+$	3895.0	9$^+$		
377.4		5336.0	(12$^-$)	4958.6	(11$^+$)		
382.3		3895.0	9$^+$	3512.6	8$^+$		
398.5[‡]		2481.1	4$^+$	2083.1	4$^+$	M1,E2	
432.4		2515.5	3$^+$,4$^+$	2083.1	4$^+$	M1,E2	
487.0		2083.1	4$^+$	1596.2	2$^+$	E2	Mult.: A$_2$=+0.05 *1*, A$_4$=−0.01 *1* (1970Sm05).
520.9		2628.5	6$^+$	2107.7	6$^+$	E2	
548.3		4263.2	10$^+$	3715.0	10$^+$		
575[#@]		2658.1?		2083.1	4$^+$		
588.8		4852.0	12$^+$	4263.2	10$^+$		
734.2		4449.2	(9,11)	3715.0	10$^+$		
739.8		3255.3	5$^-$	2515.5	3$^+$,4$^+$		
751.5		2347.7	2$^+$	1596.2	2$^+$	E2	
775[#@]		3255.3	5$^-$	2481.1	4$^+$		

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^{138}Ba(α,2nγ) 1984En01,1986En06 (continued)

$\gamma(^{140}Ce)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
815.7	2411.9	3^+	1596.2	2^+	M1,E2	
848.2	3476.7	8^-	2628.5	6^+		
867.6	2463.8	3^-	1596.2	2^+	E1	
919.3	2515.5	$3^+,4^+$	1596.2	2^+	E2	
925.2	2521.4	2^+	1596.2	2^+	M1,E2	
983.1[‡]	3395.0	4^+	2411.9	3^+	M1,E2	
992.2	3620.7	8^+	2628.5	6^+		
1032.7	3661.2	(7,8)	2628.5	6^+		
1041.3	3522.4?	(5)	2481.1	4^+		
1046[#]	3395.0	4^+	2349.7	5^+		
1058.4[@]	4571.0?	$(8^+,10^+)$	3512.6	8^+		
1083.0[‡]	3432.7	7^+	2349.7	5^+	E2	
1085[#@]	3168.1?		2083.1	4^+		
1134.4	3484.1	6^+	2349.7	5^+	E2	
1137.0	4852.0	12^+	3715.0	10^+	E2	
1184.8	3534.5?	(3,4)	2349.7	5^+		
1190.0	4905.0	11^-	3715.0	10^+	E1	
1308[#]	3391		2083.1	4^+		
1317.3	3424.4	7^-	2107.7	6^+	E1	Mult.: A_2=−0.13 *11*, A_4=−0.02 *16* (1970Sm05).
1355.2	5070.2	(9,11)	3715.0	10^+	D	
1384.7	3492.8	9^-	2107.7	6^+		
1404.8	3512.6	8^+	2107.7	6^+	E2	Mult.: A_2=+0.31 *18*, A_4=−0.29 *26* (1970Sm05).
1465.9	4958.6	(11^+)	3492.8	9^-		
1512.9	3620.7	8^+	2107.7	6^+		
1596.1	1596.2	2^+	0.0	0^+	E2	Mult.: A_2=+0.04 *3*, A_4=+0.00 *14* (1970Sm05).
1621.0[@]	3970.7?		2349.7	5^+		
1903.3[‡]	1903.2	0^+	0.0	0^+		

[†] From α(K)exp (1979BiZN).
[‡] From 1979BiZN, 1978CeZZ.
[#] Reported only in 1978CeZZ.
[@] Placement of transition in the level scheme is uncertain.

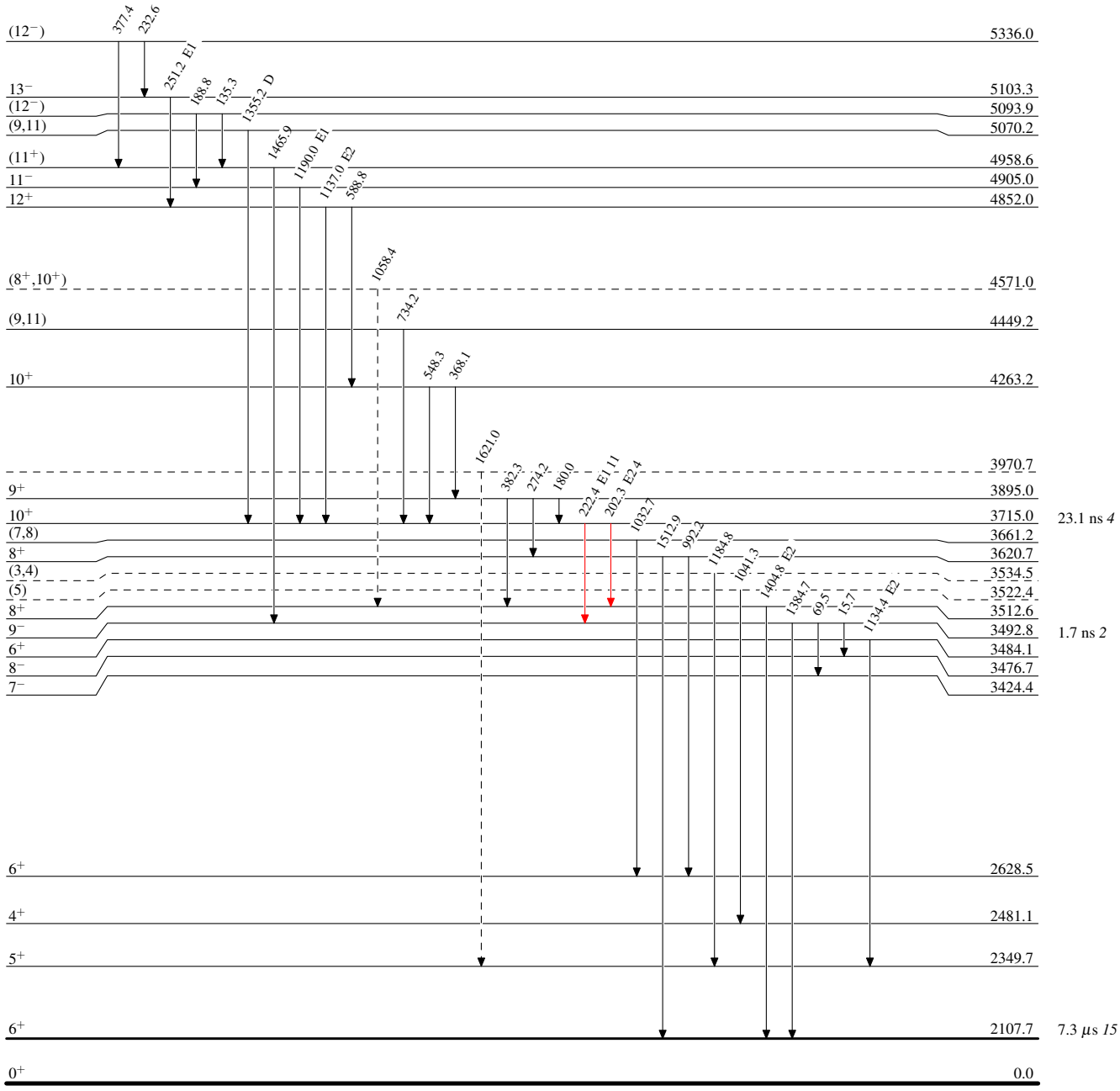
^{138}Ba(α,2nγ) 1984En01,1986En06

Level Scheme

Intensities: Type not specified

Legend

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



$^{140}_{58}Ce_{82}$

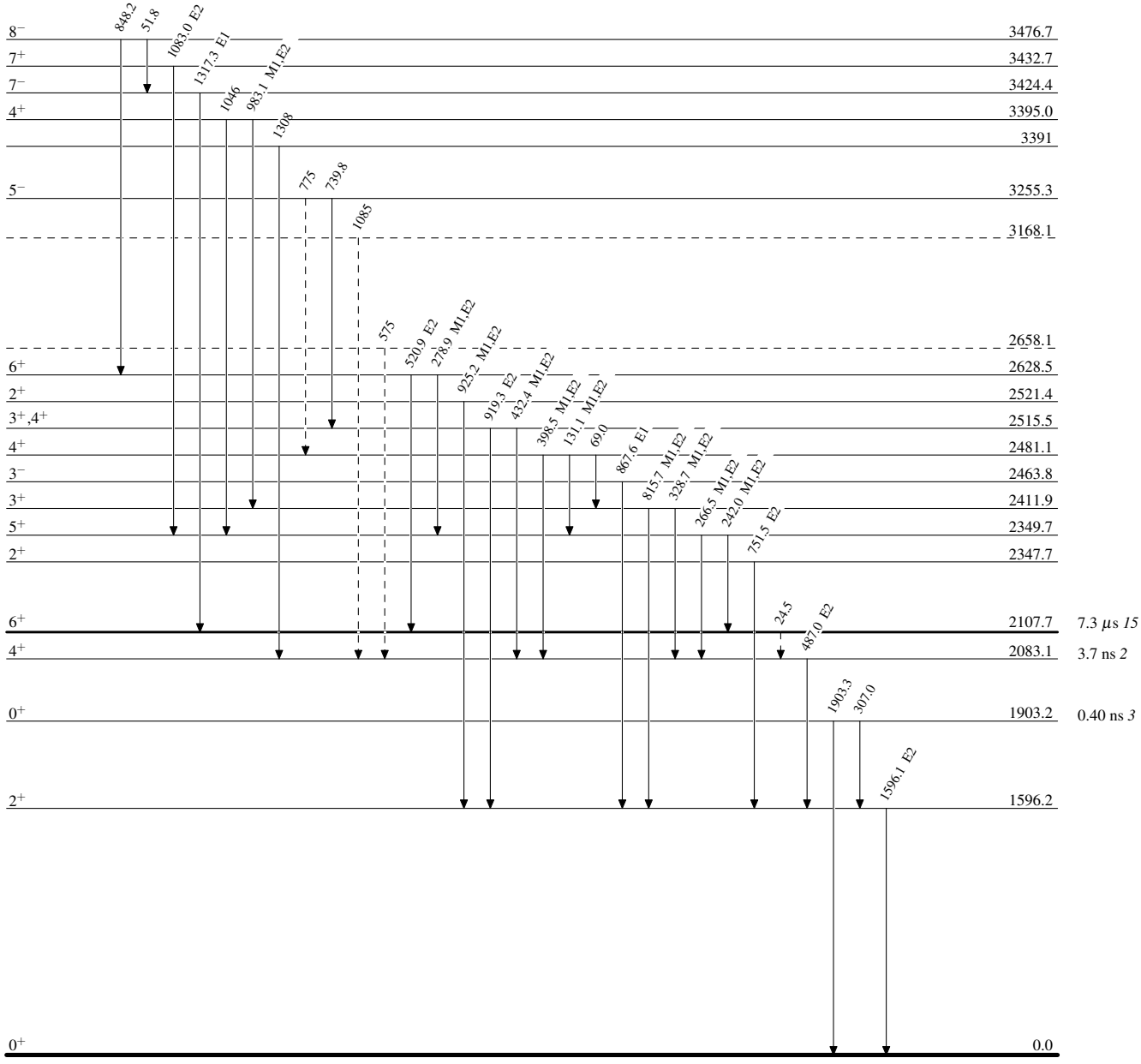
^{138}Ba(α,2nγ) 1984En01,1986En06

Legend

Level Scheme (continued)

Intensities: Type not specified

γ Decay (Uncertain)



$^{140}_{58}Ce_{82}$