

¹⁴⁰Ce(d,p),(d,pγ) **1977Pa03,1976Pi15,1975Bo03**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

E=17 MeV (1977Pa03), E=8 MeV (1976Pi15), E=19 MeV (1975Bo03). Others: 1971Br05, 1968He02, 1967Wi08, 1962Fu10, 1961Ho11; see also 1977St33.

Measured: σ(E,θ) (1977Pa03,1975Bo03), pγ coin (1976Pi15); DWBA analysis.

¹⁴¹Ce Levels

E(level) [†]	Jπ&	L@	S'@	Comments
0.0	7/2 ⁻	3	6.34	
662 1	3/2 ⁻	1	1.68	
1138 2	1/2 ⁻	1	0.73	
1355 2	9/2 ⁻	5	7.0	
1367 2	13/2 ⁺	6	9.0 1	
1378 2	(9/2 ⁻ ,11/2 ⁻)	(5)		L: from 1967Wi08.
1497 2	5/2 ⁻	3	1.60	
1693 2	11/2 ⁻	5	2.91	
1736 2	7/2 ⁻	3	0.92	
1807 3	3/2 ⁻	1	0.23	
1812 2	5/2 ⁻	3	0.92	
1992 3	(1/2) ⁻	1	0.07	
2113 [‡] 2	(5/2) ⁻	3	0.58	E(level): from 1976Pi15.
2166 2	3/2 ⁻	1	0.09	
2172 2	5/2 ⁻			L=3 for 2177 (1975Bo03); other: L=(4) (1977Pa03).
2189 [#] 2	3/2 ⁻	(1)	0.09	
2189 [#] 2	(5/2 ⁻ ,7/2 ⁻)	(3)	0.25	
2209 2	(7/2 ⁺)			S': weakly excited.
2263 [#] 2	(5/2 ⁺)	(2)	0.05	
2263 [#] 2	(7/2 ⁺ ,9/2 ⁺)	(4)	0.12	
2292 [‡] 2	(⁺)	(2+4)	0.01+0.06	
2323 5	7/2 ⁻	3	0.19	
2335	3/2 ⁻	1	0.27	
2402 2	(5/2 ⁻)	3		L: from 1971Br05.
2410	1/2 ⁻	1	0.45	
2424 3	3/2 ⁻	1	0.45	
2450 2		(3)	0.18	
2507 2		(2)	0.03	
2521	1/2 ⁻ ,3/2 ⁻	1	0.14	
2555 2				
2611 2		(1)	0.07	
2634 2	5/2 ⁻ ,7/2 ⁻	3	0.16	
2899 [#] 2		(2)	0.03	
2899 [#] 2	(13/2 ⁺ ,11/2 ⁺)	(6)	2.1	
3012 3				
3070 [#] 3	1/2 ⁻ ,3/2 ⁻	1	0.08	
3070 [#] 3	5/2 ⁻ ,7/2 ⁻	3	0.14	
3109 3				
3159 3	(1/2 ⁻ ,3/2 ⁻)	(1)	0.05	
3175 3				
3203 3				
3235 3				
3265 [‡] 3		(1+3)	0.11+0.17	

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¹⁴⁰Ce(d,p),(d,pγ) 1977Pa03,1976Pi15,1975Bo03 (continued)

¹⁴¹Ce Levels (continued)

E(level) [†]	J ^π &	L [@]	S' [@]	Comments
3297 3		(1)	0.08	
3319 [‡] 3		(2+4)	0.05+0.10	
3351 [#] 3	1/2 ⁺	0	0.02	
3351 [#] 3	(3/2 ⁺ ,5/2 ⁺)	(2)	0.14	
3408 3	(3/2 ⁺ ,5/2 ⁺)	(2)	0.03	
3449 [‡] 3				L: L=(0) (1977Pa03); L=1 (1975Bo03).
3486 3		(3)	0.07	
3523 3		(4)	0.34	
3578 3		(4)	0.29	
3673 3	(3/2 ⁺ ,5/2 ⁺)	(2)	0.06	
3684 3		(4)	0.42	

[†] Unless mentioned otherwise and depending on reaction, from 1977Pa03 for (d,p) and from 1976Pi15 for (d,pγ) (or for levels retrieved with both reactions). Uncertainties of 2 keV or 3 keV were adopted by 1977Pa03 for levels below of greater than 3000 keV, respectively, while for 1976Pi15 uncertainties derive from those of E_γ's.

[‡] Unresolved or poorly resolved doublet from 1977Pa03.

[#] Members of doublet from 1977Pa03 distinguished by J^π's.

[@] S', L are from 1977Pa03, except where noted. For reduced normalization see 1977St33, 1978St13.

& Adopted values.

γ(¹⁴¹Ce)

E _γ [†]	I _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π
476 1	130 18	1138	1/2 ⁻	662	3/2 ⁻
592 [#] 2	<3.5	2402	(5/2 ⁻)	1812	5/2 ⁻
602 [#] 2	8.2 27	2410	1/2 ⁻	1807	3/2 ⁻
617 2	16.8 33	2424	3/2 ⁻	1807	3/2 ⁻
662 1	232 24	662	3/2 ⁻	0.0	7/2 ⁻
671 3	25 10	1807	3/2 ⁻	1138	1/2 ⁻
791 [#] 3	4.3 50	2166	3/2 ⁻	1378	(9/2 ⁻ ,11/2 ⁻)
835 1	12.6 39	1497	5/2 ⁻	662	3/2 ⁻
912 2	25 4	2402	(5/2 ⁻)	1497	5/2 ⁻
1051 2	34.4 40	2189	3/2 ⁻	1138	1/2 ⁻
1070 [#] 2	3.6 17	1736	7/2 ⁻	662	3/2 ⁻
1145 1	18.0 26	1807	3/2 ⁻	662	3/2 ⁻
1151 1	6.9 21	1812	5/2 ⁻	662	3/2 ⁻
1197 2	57 7	2335	3/2 ⁻	1138	1/2 ⁻
1264 ^{‡#} 2	3.1 20	2402	(5/2 ⁻)	1138	1/2 ⁻
1264 ^{‡#} 2		2410	1/2 ⁻	1138	1/2 ⁻
1286 2	107 11	2424	3/2 ⁻	1138	1/2 ⁻
1330 2	23.0 38	1992	(1/2 ⁻)	662	3/2 ⁻
1367 2	20 3	1367	13/2 ⁺	0.0	7/2 ⁻
1378 2	17 6	1378	(9/2 ⁻ ,11/2 ⁻)	0.0	7/2 ⁻
1383 2	46 6	2521	1/2 ⁻ ,3/2 ⁻	1138	1/2 ⁻
1454 2	7.5 7	2113	(5/2 ⁻)	662	3/2 ⁻
1495 2	91 9	1497	5/2 ⁻	0.0	7/2 ⁻
1502 [#] 2	5.7 40	2166	3/2 ⁻	662	3/2 ⁻
1525 2	24.4 40	2189	3/2 ⁻	662	3/2 ⁻
1671 2	14 5	2335	3/2 ⁻	662	3/2 ⁻
1736 2	82.4 92	1736	7/2 ⁻	0.0	7/2 ⁻

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$^{140}\text{Ce}(\text{d,p}),(\text{d,p}\gamma)$ 1977Pa03,1976Pi15,1975Bo03 (continued) $\gamma(^{141}\text{Ce})$ (continued)

E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	
1744 ‡ #	1	132 18	2402	(5/2 ⁻)	662	3/2 ⁻	2113 2	65.1 50	2113	(5/2 ⁻)	0.0	7/2 ⁻
1744 ‡ #	2		2410	1/2 ⁻	662	3/2 ⁻	2166 2	18.7 35	2166	3/2 ⁻	0.0	7/2 ⁻
1768 2	25 6	2424	3/2 ⁻	662	3/2 ⁻	2323 2	39 6	2323	7/2 ⁻	0.0	7/2 ⁻	
1804 3	17 4	1807	3/2 ⁻	0.0	7/2 ⁻	2402 2	16 4	2402	(5/2 ⁻)	0.0	7/2 ⁻	
1811 2	111 16	1812	5/2 ⁻	0.0	7/2 ⁻							

† From 1976Pi15.

‡ Multiply placed.

Placement of transition in the level scheme is uncertain.

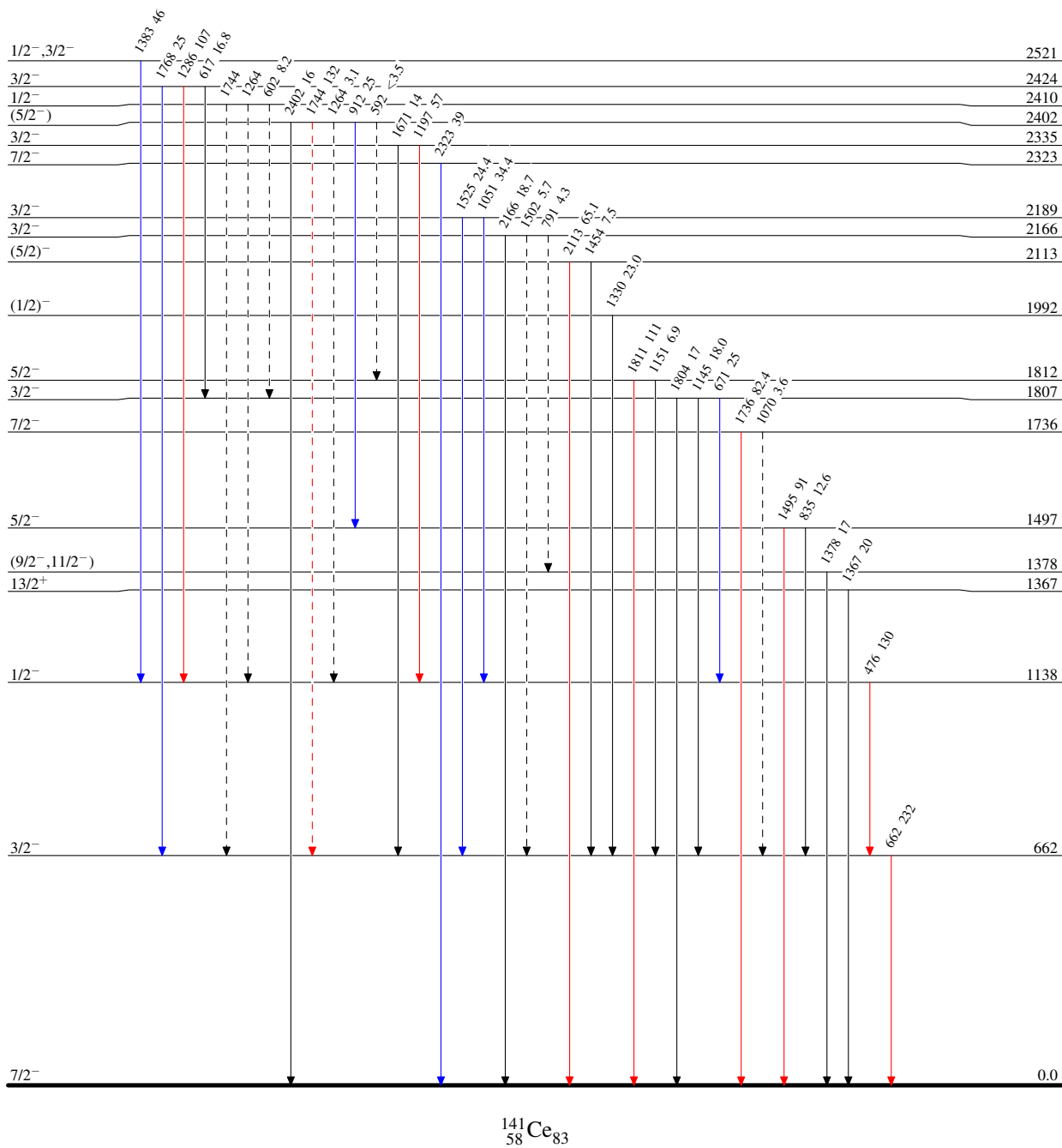
$^{140}\text{Ce}(\text{d,p}),(\text{d,p}\gamma)$ 1977Pa03,1976Pi15,1975Bo03

Legend

Level Scheme

Intensities: Type not specified

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



$^{141}_{58}\text{Ce}_{83}$