^{142}Ce(p,2nγ) 1981Ko16

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

E=19.6-17.4 MeV.
Measured: γ, $\gamma\gamma$, γ(t), $\gamma(\theta)$, ce.

^{141}Pr Levels

E(level)	J^{π}‡	$T_{1/2}$†	Comments
0.0	$5/2^+$	stable	
145.44	$7/2^+$	1.85 ns	$T_{1/2}$: adopted value; similar value of $T_{1/2}$ was measured in 1981Ko16.
1117.5 *2*	$11/2^-$	4.8 ns *3*	$T_{1/2}$: from 19881Ko16.
1126.9 *2*	$3/2^+$		
1292.7 *2*	$(5/2)^+$		
1298.6 *2*	$1/2^+$		
1434.4 *3*	$3/2^+$		
1452.2 *3*	$(7/2)^+$		
1457.4 *3*	$9/2^+$		
1494.1 *3*	$11/2^+$		
1520.9 *4*	$9/2^+$		
1580.0 *4*	$5/2^-$		
1607.7 *5*	$(3/2)^+$		
1651.2 *5*			
1657.4 *3*	$1/2^+$		
1767.8 *3*	$13/2^+$		
1786.2 *5*	$(5/2^+)$		
1796.7 *4*	$15/2^+$		
1812.2 *6*	$(9/2^+)$		
1841.8 *5*	$(7/2^+)$		
1854.0 *4*	$(11/2^+)$		
1975.7 *5*	$(3/2^+)$		
1986.4 *6*	$(13/2^+)$		
2003.1 *6*	$(11/2^+)$		
2069.3 *4*	$17/2^+$		
2104.8 *5*	$(5/2^-)$		
2108.4 *5*	$15/2^{(+)}$		
2126.3 *4*	$(11/2^+)$		
2173.0	$9/2^-$		
2206.7	$11/2^+$		
2243.3 *4*			
2382.5 *5*	$(9/2^-)$		
2626.8 *5*	$(15/2^-)$		
2752.0 *5*			
2927.7 *5*	$19/2^-$		

† For all levels, except where noted otherwise, $T_{1/2}$<1.5 ns.
‡ Adopted values.

^{142}Ce(p,2nγ) 1981Ko16 (continued)

$\gamma(^{141}Pr)$

α(K)exp were normalized to α(K)(E2) for 641.2γ in ^{142}Ce(p,p′γ).
Presented data were taken at E(p)=17.4 MeV.

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[‡]	Comments
(28.9)		1796.7	$15/2^+$	1767.8	$13/2^+$			
122.17 *10*	0.5 *2*	2108.4	$15/2^{(+)}$	1986.4	$(13/2^+)$			
145.44 *8*	100	145.44	$7/2^+$	0.0	$5/2^+$			
218.58 *8*	2.5 *3*	1986.4	$(13/2^+)$	1767.8	$13/2^+$	M1+E2		Mult.: A_2=+0.24 *2*, A_4=−0.04 *3*.
272.6 *1*	6.4 *3*	2069.3	$17/2^+$	1796.7	$15/2^+$			Mult.: α(K)exp=0.071 *8* (272.6γ+273.7γ).
273.7 *1*	6.6 *3*	1767.8	$13/2^+$	1494.1	$11/2^+$			Mult.: α(K)exp=0.071 *8* (273.7γ+272.6γ).
301.4 *1*	0.6 *2*	2069.3	$17/2^+$	1767.8	$13/2^+$			Mult.: α(K)exp=0.051 *6* (301.4γ+302.6γ).
302.6 *1*	2.2 *3*	1796.7	$15/2^+$	1494.1	$11/2^+$	E2	0.0494	α(K)= 0.0394; α(L)=0.00785; α(M)=0.00170; α(N+..)=0.00045 Mult.: α(K)exp=0.051 *6* (302.6γ+301.4γ), A_2=+0.25 *2*, A_4=−0.05 *3*.
310.4 *1*	1.1 *3*	1767.8	$13/2^+$	1457.4	$9/2^+$			Mult.: α(K)exp=0.014 *3*, A_2=+0.32 *1*, A_4=−0.06 *1* (310.4γ+311.7γ).
311.7 *1*	2.5 *3*	2108.4	$15/2^{(+)}$	1796.7	$15/2^+$			Mult.: α(K)exp=0.014 *3*, A_2=+0.32 *1*, A_4=−0.06 *1* (311.7γ+310.4γ).
340.6 *1*	1.0 *2*	2108.4	$15/2^{(+)}$	1767.8	$13/2^+$			
360.0 *1*	1.2 *2*	1812.2	$(9/2^+)$	1452.2	$(7/2)^+$			
530.53 *12*	1.1 *2*	1657.4	$1/2^+$	1126.9	$3/2^+$	E2	0.00971	α(K)=0.00803; α(L)=0.00126 Mult.: α(K)exp=0.008 *2*.
[x]614.43 *12*	0.7 *2*							
[x]622.52 *12*	1.1 *2*							
650.16 *10*	25 *4*	1767.8	$13/2^+$	1117.5	$11/2^-$	E1	0.00212	α(K)=0.00182; α(L)=0.00023 Mult.: α(K)exp=0.0016 *3*, A_2=−0.20 *1*, A_4=−0.02 *2*.
[x]661.9 *1*	3.0 *5*							
668.9 *1*	4.5 *5*	2126.3	$(11/2^+)$	1457.4	$9/2^+$	M1+E2		Mult.: α(K)exp=0.0059 *11*, A_2=−0.10 *2*, A_4=−0.02 *3*.
749.17 *10*	3.5 *5*	2243.3		1494.1	$11/2^+$	D+(Q)		Mult.: A_2=−0.14 *2*, A_4=+0.05 *3*.
858.42 *15*	1.0 *2*	2927.7	$19/2^-$	2069.3	$17/2^+$	(E1)	0.00120	α(K)=0.00103; α(L)=0.00013 Mult.: α(K)exp<0.0012.
861.57 *15*	1.7 *3*	2382.5	$(9/2^-)$	1520.9	$9/2^+$			
868.82 *15*	4.5 *5*	1986.4	$(13/2^+)$	1117.5	$11/2^-$	E1	0.00117	α(K)=0.00101; α(L)=0.00013 Mult.: α(K)exp=0.0008 *2*.
963.1 *1*	3.0 *5*	2752.0		1786.2	$(5/2^+)$			
972.18 *15*	52 *5*	1117.5	$11/2^-$	145.44	$7/2^+$	M2	0.00858	α(K)=0.00726; α(L)= 0.0010 Mult.: α(K)exp=0.0080 *9*, A_2=+0.20 *2*, A_4=−0.06 *3*.
1117.65 *15*	5.5 *5*	1117.5	$11/2^-$	0.0	$5/2^+$	E3	0.00349	α(K)=0.00291; α(L)=0.00044 Mult.: α(K)exp=0.0029 *8*, A_2=+0.34 *3*, A_4=−0.03 *5*.
1126.9 *2*	21 *3*	1126.9	$3/2^+$	0.0	$5/2^+$	M1+E2		Mult.: α(K)exp=0.0014 *3*, A_2=−0.09 *2*, A_4=−0.04 *3*.
1147.2 *2*	6.5 *5*	1292.7	$(5/2)^+$	145.44	$7/2^+$			
[x]1291.6 *2*	5 *2*							
1292.7 *2*	11 *3*	1292.7	$(5/2)^+$	0.0	$5/2^+$	D+(Q)		Mult.: A_2=−0.12 *2*, A_4=−0.02 *4*.
1298.6 *2*	5.2 *5*	1298.6	$1/2^+$	0.0	$5/2^+$			Mult.: A_2=−0.10 *2*, A_4=−0.05 *3*, contradict with L=0 in (^{3}He,d).

Continued on next page (footnotes at end of table)

^{142}Ce(p,2nγ) 1981Ko16 (continued)

γ(^{141}Pr) (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[‡]	Comments
1306.8 *2*	12 *1*	1452.2	$(7/2)^+$	145.44	$7/2^+$	M1+E2		Mult.: α(K)exp=0.00079 *20*, A_2=−0.14 *1*, A_4=−0.04 *2*.
1311.9 *2*	16 *1*	1457.4	$9/2^+$	145.44	$7/2^+$	M1+E2		Mult.: α(K)exp=0.00082 *20*, A_2=−0.15 *2*, A_4=+0.04 *3*.
1348.7 *2*	35 *2*	1494.1	$11/2^+$	145.44	$7/2^+$	E2	0.00116	α(K)=0.00099; α(L)=0.00013 Mult.: α(K)exp=0.0012 *3*, A_2=+0.23 *2*, A_4=−0.07 *3*.
1375.6 *3*	1.8 *3*	1520.9	$9/2^+$	145.44	$7/2^+$			
1434.4 *3*	3 *1*	1434.4	$3/2^+$	0.0	$5/2^+$			
1434.7 *3*	11 *2*	1580.0	$5/2^-$	145.44	$7/2^+$	E1	0.00047	α(K)=0.00040 Mult.: α(K)exp=0.00032 *9*.
1452.3 *4*	3 *1*	1452.2	$(7/2)^+$	0.0	$5/2^+$			
1457.4 *3*	6 *1*	1457.4	$9/2^+$	0.0	$5/2^+$			
1505.7 *4*	1.3 *5*	1651.2		145.44	$7/2^+$			
1509.1 *4*	2.5 *5*	2626.8	$(15/2^-)$	1117.5	$11/2^-$			
1520.9 *4*	20 *2*	1520.9	$9/2^+$	0.0	$5/2^+$	E2		Mult.: α(K)exp=0.00076 *10*, A_2=+0.15 *1*, A_4=−0.07 *2*, contradict A_2=−0.13 *10* in (α,2nγ).
1579.9 *5*	2.2 *4*	1580.0	$5/2^-$	0.0	$5/2^+$			
[x]1583.8 *5*	1.6 *5*							
1607.7 *5*	4.1 *5*	1607.7	$(3/2)^+$	0.0	$5/2^+$			
1651.2 *5*	8.5 *8*	1651.2		0.0	$5/2^+$			
1667.1 *5*	4.8 *6*	1812.2	$(9/2^+)$	145.44	$7/2^+$	D		Mult.: A_2=−0.33 *4*, A_4=−0.01 *6*.
1708.6 *3*	10 *1*	1854.0	$(11/2^+)$	145.44	$7/2^+$	E2		Mult.: α(K)exp=0.00036 *11*, A_2=+0.24 *1*, A_4=−0.09 *1*.
1786.2 *5*	3.3 *6*	1786.2	$(5/2^+)$	0.0	$5/2^+$			
1841.8 *5*	4.0 *5*	1841.8	$(7/2^+)$	0.0	$5/2^+$			
1854.0 *5*	3.2 *6*	1854.0	$(11/2^+)$	0.0	$5/2^+$			
1857.7 *5*	8.6 *10*	2003.1	$(11/2^+)$	145.44	$7/2^+$			
1959.4 *5*	2.5 *5*	2104.8	$(5/2^-)$	145.44	$7/2^+$			
1975.7 *5*	1.7 *4*	1975.7	$(3/2^+)$	0.0	$5/2^+$			
2027.6 *5*	3.2 *5*	2173.0	$9/2^-$	145.44	$7/2^+$			
2061.3 *5*	4.3 *8*	2206.7	$11/2^+$	145.44	$7/2^+$			

[†] Relative Iγ.

[‡] 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.

[x] γ ray not placed in level scheme.

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Level Scheme

Intensities: Type not specified

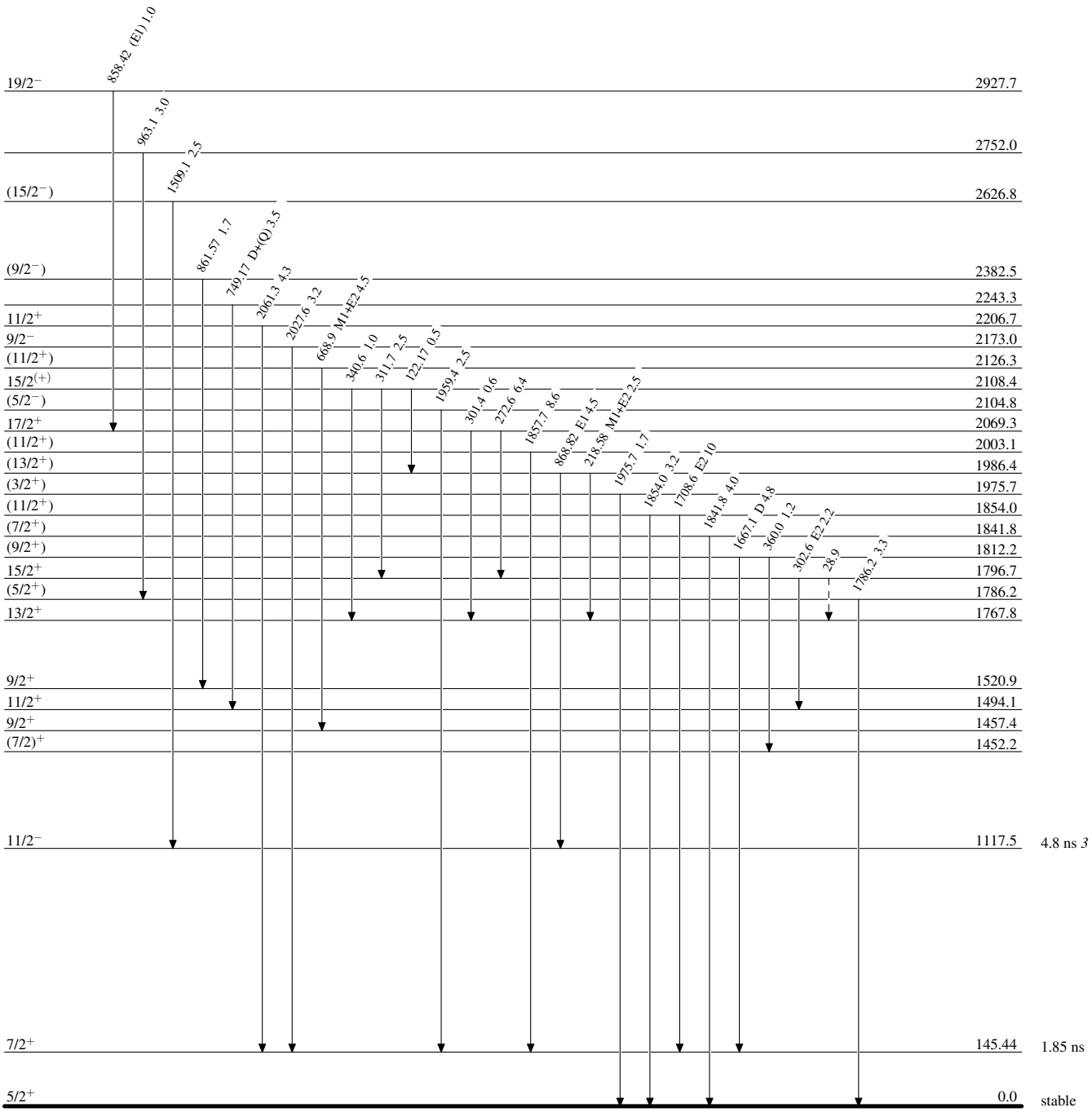
Legend

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

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

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

γ Decay (Uncertain)

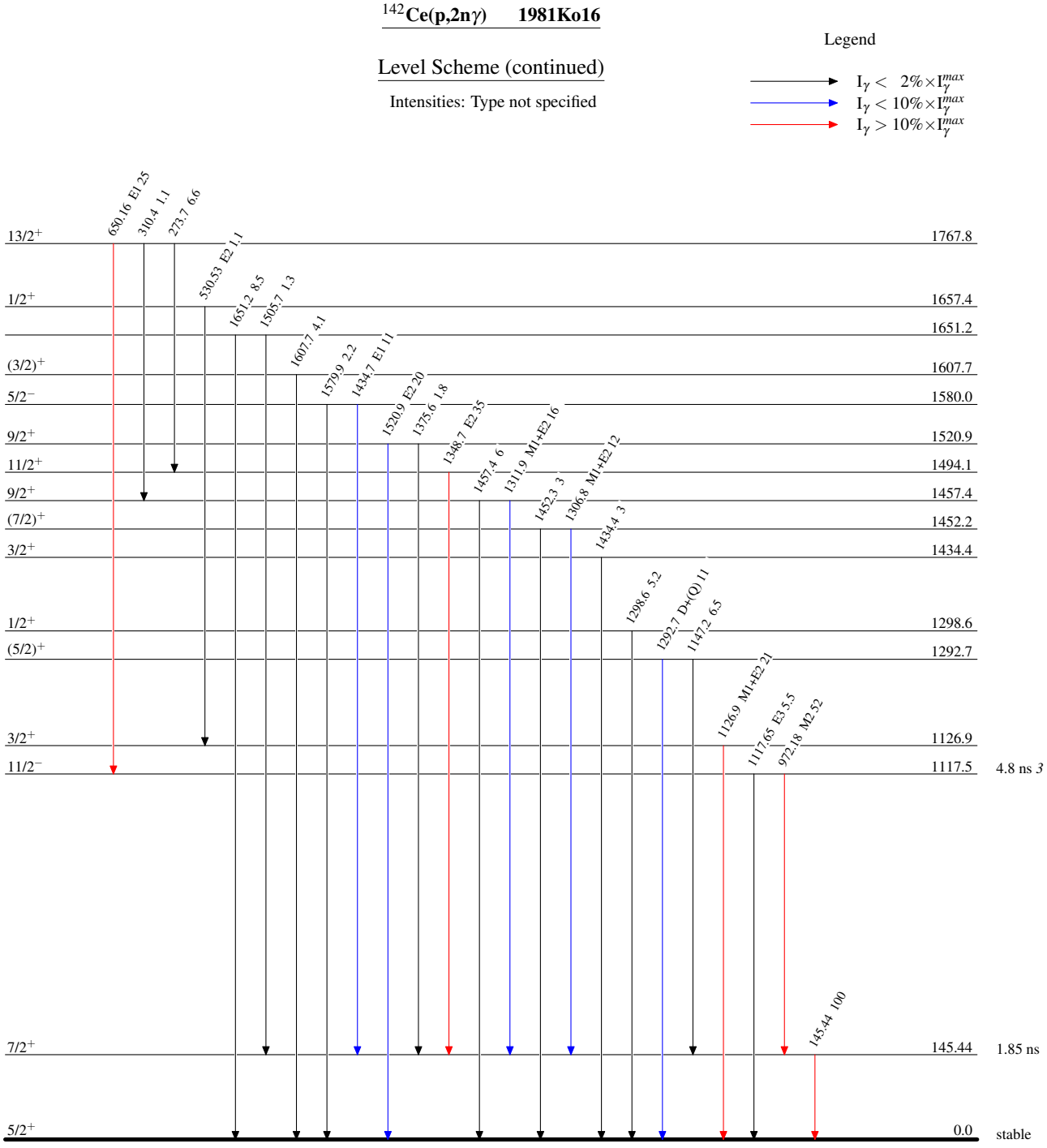


$^{141}_{59}Pr_{82}$

^{142}Ce(p,2nγ) 1981Ko16

Level Scheme (continued)

Intensities: Type not specified



$^{141}_{59}Pr_{82}$