

$^{140}\text{Ce}(\alpha, n\gamma)$ 1990Wr01

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 113, 715 (2012)		31-May-2011

E=14-21 MeV. Measured: γ rays, $\gamma\gamma$ coin, $\gamma(\theta)$, excit.

 ^{143}Nd Levels

E(level)	$J^\pi^\dagger$	E(level)	$J^\pi^\dagger$	E(level)	$J^\pi^\dagger$
0.0	$7/2^-$	2187.08 12	$5/2^-$	2490.2 ‡ 10	$19/2^-$
742.10 7	$3/2^-$	2196.92 16	$7/2^-$	2496.19 15	$7/2^-$
1228.07 7	$13/2^+$	2201.24 9	$11/2^-$	2504.68 23	$(15/2)^-$
1305.91 9	$1/2^-$	2220.72 18	$5/2^+$	2517.68 19	$(11/2, 13/2)^-$
1407.09 6	$9/2^-$	2223.23 10	$13/2^-$	2528.17 18	$7/2^-$
1431.24 7	$11/2^-$	2242.22 15	$11/2^+$	2529.82 22	$3/2^-$
1555.52 7	$5/2^-$	2249.33 14	$11/2^-$	2557.0 5	$(9/2)^+$
1556.61 13	$3/2^+$	2255.76 9	$3/2^-, 1/2^-, (5/2^-)$	2577.85 22	$11/2, 13/2$
1608.39 12	$1/2^+$	2283.97 16	$7/2^-$	2588.05 18	$5/2^-$
1739.21 8	$9/2^-$	2294.57 11	$13/2^-$	2590.22 21	$11/2^-$
1774.88 20	$1/2^+$	2317.9 4	$(7/2)$	2662.2 3	$3/2^-$
1799.50 10	$3/2^+$	2322.9 3	$1/2^-, 3/2^-$	2672.22 20	$(9/2^-)$
1851.5 3	$7/2^-$	2323.24 10	$11/2^-$	2684.0 3	$3/2^-$
1852.56 9	$3/2^-$	2347.12 16	$9/2^{(-)}$	2700.62 23	
1910.83 9	$5/2^-$	2359.67 21	$15/2^+$	2730.8 5	
1988.24 8	$11/2^-$	2361.54 12	$3/2^-$	2750.0 4	$13/2^-$
1996.40 10	$5/2^+$	2398.22 14	$17/2^-$	2759.2 4	
2004.81 12	$1/2^-$	2398.63 11	$9/2^-$	2785.1 3	
2011.3 3	$9/2^+$	2405.53 19	$5/2$	2788.0 5	
2018.92 10	$15/2^-$	2405.6 5	$(1/2^-, 3/2^-)$	2798.2 3	
2035.61 13	$7/2^-$	2415.5 3		2799.9 3	
2063.85 24	$(7/2, 9/2)$	2420.12 21	$3/2^-$	2805.4 3	$13/2^+$
2066.85 9	$13/2^-$	2433.4 3	$5/2^-$	2884.5 6	
2075.15 11	$11/2^-$	2443.31 15	$9/2^-$	2886.1 5	
2090.60 9	$7/2^+$	2451.81 23	$1/2, 3/2$	2891.58 21	
2094.41 10	$11/2^-$	2451.9 3		2911.1 11	$21/2^+$
2125.82 11	$3/2^-$	2460.05 18	$5/2^-$	2911.7 5	
2134.44 15	$9/2^-$	2463.76 19	$11/2^-$	2943.0 5	$(13/2)$
2173.67 16	$7/2^+$	2483.07 12	$17/2^+$	3024.2 11	$21/2^+$

† From Adopted Levels.

‡ From $^{142}\text{Ce}(\alpha, 3n\gamma)$.

¹⁴⁰Ce(α ,n γ) **1990Wr01** (continued)

$\gamma(^{143}\text{Nd})$

I γ , $\gamma(\theta)$ at E=17 MeV, ce at E=18 MeV.

E γ	I γ	E i (level)	J $^\pi_i$	E f	J $^\pi_f$	Mult. [‡]	$\alpha^\dagger$	Comments
(92.0)		2490.2	19/2 ⁻	2398.22	17/2 ⁻			
170.5 2	0.10 5	2517.68	(11/2,13/2) ⁻	2347.12	9/2 ⁽⁻⁾			
191.1 1	0.7 1	1799.50	3/2 ⁺	1608.39	1/2 ⁺			Mult.: A ₂ =+0.04 12, A ₄ =+0.06 19.
200.1 2	0.6 1	2294.57	13/2 ⁻	2094.41	11/2 ⁻	D		Mult.: A ₂ =-0.29 9, A ₄ =+0.14 17.
203.3 3	0.2 [#] 1	1431.24	11/2 ⁻	1228.07	13/2 ⁺			
204.3 2	0.8 2	2223.23	13/2 ⁻	2018.92	15/2 ⁻	D		Mult.: A ₂ =-0.26 9, A ₄ =+0.11 13.
212.8 2	1.1 2	2201.24	11/2 ⁻	1988.24	11/2 ⁻	D+Q		Mult.: A ₂ =+0.16 5, A ₄ =+0.00 9.
234.8 2	0.4 1	2223.23	13/2 ⁻	1988.24	11/2 ⁻	D		Mult.: A ₂ =-0.22 8, A ₄ =+0.06 17.
242.0 2	0.4 1	2443.31	9/2 ⁻	2201.24	11/2 ⁻			
243.5 8	0.10 [#] 5	1799.50	3/2 ⁺	1556.61	3/2 ⁺			
244.0 1	0.5 1	1799.50	3/2 ⁺	1555.52	5/2 ⁻			
250.7 2	0.4 2	1556.61	3/2 ⁺	1305.91	1/2 ⁻			
261.2 2	1.1 2	2249.33	11/2 ⁻	1988.24	11/2 ⁻			
273.4 3	0.4 [#] 2	2125.82	3/2 ⁻	1852.56	3/2 ⁻			
275.6 1	2.1 2	2294.57	13/2 ⁻	2018.92	15/2 ⁻	D		Mult.: A ₂ =-0.12 3, A ₄ =+0.03 5.
283.8 5	0.2 [#] 1	2577.85	11/2,13/2	2294.57	13/2 ⁻			
306.7 3	0.6 1	2294.57	13/2 ⁻	1988.24	11/2 ⁻			Mult.: A ₂ =+0.18 4, A ₄ =+0.28 13.
308.1 2	0.3 2	1739.21	9/2 ⁻	1431.24	11/2 ⁻			
316.6 3	0.2 1	2517.68	(11/2,13/2) ⁻	2201.24	11/2 ⁻			
332 1	0.10 [#] 5	2398.63	9/2 ⁻	2066.85	13/2 ⁻			
340.8 2	0.4 [#] 2	2359.67	15/2 ⁺	2018.92	15/2 ⁻	E1	0.00983 14	α =0.00983 14; α (K)=0.00842 12; α (L)=0.001115 16; α (M)=0.000235 4; α (N+..)=6.06 $\times$ 10 ⁻⁵ 9 α (N)=5.23 $\times$ 10 ⁻⁵ 8; α (O)=7.82 $\times$ 10 ⁻⁶ 11; α (P)=4.79 $\times$ 10 ⁻⁷ 7 Mult.: α (K)exp=0.009 2.
344.8 3	0.4 1	2255.76	3/2 ⁻ ,1/2 ⁻ , (5/2 ⁻)	1910.83	5/2 ⁻			
354.6 3	0.6 [#] 3	2577.85	11/2,13/2	2223.23	13/2 ⁻			
355.3 2	1.6 3	2094.41	11/2 ⁻	1739.21	9/2 ⁻			
355.4 2	0.3 1	1910.83	5/2 ⁻	1555.52	5/2 ⁻			
368.2 2	0.7 1	2443.31	9/2 ⁻	2075.15	11/2 ⁻	M1,E2	0.034 6	α (K)=0.028 6; α (L)=0.00441 21; α (M)=0.00095 4; α (N+..)=0.000243 12 α (N)=0.000210 9; α (O)=3.11 $\times$ 10 ⁻⁵ 23; α (P)=1.7 $\times$ 10 ⁻⁶ 5 Mult.: A ₂ =-0.05 7, A ₄ =-0.09 9; α (K)exp=0.020 5.
379.3 1	1.7 2	2398.22	17/2 ⁻	2018.92	15/2 ⁻	M1	0.0370	α (K)=0.0316 5; α (L)=0.00426 6; α (M)=0.000902 13; α (N+..)=0.000235 4 α (N)=0.000202 3; α (O)=3.08 $\times$ 10 ⁻⁵ 5; α (P)=2.02 $\times$ 10 ⁻⁶ 3 Mult.: A ₂ =-0.23 4, A ₄ =+0.02 7; α (K)exp=0.029 4.
403.2 1	1.4 2	2255.76	3/2 ⁻ ,1/2 ⁻ , (5/2 ⁻)	1852.56	3/2 ⁻	M1	0.0316	α (K)=0.0270 4; α (L)=0.00364 5; α (M)=0.000769 11; α (N+..)=0.000200 3

$^{140}\text{Ce}(\alpha, n\gamma)$ **1990Wr01** (continued) $\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	$\alpha^\dagger$	Comments
								$\alpha(\text{N})=0.0001723$ 25; $\alpha(\text{O})=2.62\times 10^{-5}$ 4; $\alpha(\text{P})=1.725\times 10^{-6}$ 25 Mult.: $A_2=-0.13$ 4, $A_4=+0.04$ 8; $\alpha(\text{K})_{\text{exp}}=0.023$ 4.
410 1 420.9 1	0.10 [#] 5 0.7 2	2398.63 2911.1	9/2 ⁻ 21/2 ⁺	1988.24 2490.2	11/2 ⁻ 19/2 ⁻	E1	0.00588 9	$\alpha=0.00588$ 9; $\alpha(\text{K})=0.00504$ 7; $\alpha(\text{L})=0.000662$ 10; $\alpha(\text{M})=0.0001393$ 20; $\alpha(\text{N}+..)=3.60\times 10^{-5}$ 5 $\alpha(\text{N})=3.10\times 10^{-5}$ 5; $\alpha(\text{O})=4.66\times 10^{-6}$ 7; $\alpha(\text{P})=2.90\times 10^{-7}$ 4 Mult.: $A_2=-0.37$ 16, $A_4=-0.05$ 10; $\alpha(\text{K})_{\text{exp}}=0.0049$ 6.
433.2 5 458.1 4 462.2 2	0.2 1 0.4 1 0.7 1	2451.9 2196.92 2201.24	7/2 ⁻ 11/2 ⁻	2018.92 1739.21 1739.21	15/2 ⁻ 9/2 ⁻ 9/2 ⁻	M1+(E2)	0.018 4	$\alpha(\text{K})=0.016$ 4; $\alpha(\text{L})=0.0023$ 3; $\alpha(\text{M})=0.00049$ 6; $\alpha(\text{N}+..)=0.000126$ 15 $\alpha(\text{N})=0.000109$ 13; $\alpha(\text{O})=1.62\times 10^{-5}$ 23; $\alpha(\text{P})=1.0\times 10^{-6}$ 3 Mult.: $A_2=-0.30$ 11, $A_4=-0.22$ 20; $\alpha(\text{K})_{\text{exp}}=0.015$ 5.
469.4 5 470.1 5 480.0 2	0.30 [#] 15 0.2 1 1.0 1	1774.88 2322.9 2035.61	1/2 ⁺ 1/2 ⁻ , 3/2 ⁻ 7/2 ⁻	1305.91 1852.56 1555.52	1/2 ⁻ 3/2 ⁻ 5/2 ⁻	M1,E2	0.017 4	$\alpha(\text{K})=0.014$ 4; $\alpha(\text{L})=0.0021$ 3; $\alpha(\text{M})=0.00044$ 6; $\alpha(\text{N}+..)=0.000113$ 15 $\alpha(\text{N})=9.8\times 10^{-5}$ 12; $\alpha(\text{O})=1.46\times 10^{-5}$ 22; $\alpha(\text{P})=8.7\times 10^{-7}$ 24 Mult.: $A_2=-0.14$ 7, $A_4=+0.10$ 10; $\alpha(\text{K})_{\text{exp}}=0.020$ 5.
485.6 3	0.3 1	2504.68	(15/2) ⁻	2018.92	15/2 ⁻	M1	0.0197	$\alpha(\text{K})=0.01685$ 24; $\alpha(\text{L})=0.00225$ 4; $\alpha(\text{M})=0.000476$ 7; $\alpha(\text{N}+..)=0.0001240$ 18 $\alpha(\text{N})=0.0001067$ 15; $\alpha(\text{O})=1.626\times 10^{-5}$ 23; $\alpha(\text{P})=1.072\times 10^{-6}$ 16 Mult.: $A_2=+0.55$ 21, $A_4=-0.13$ 32; $\alpha(\text{K})_{\text{exp}}=0.014$ 4.
493.3 3 495.4 5 522.3 5 529.4 5	0.5 1 0.3 1 0.2 1 0.4 1	1799.50 2405.53 2433.4 2517.68	3/2 ⁺ 5/2 5/2 ⁻ (11/2,13/2) ⁻	1305.91 1910.83 1910.83 1988.24	1/2 ⁻ 5/2 ⁻ 5/2 ⁻ 11/2 ⁻	M1+E2	0.013 3	$\alpha(\text{K})=0.011$ 3; $\alpha(\text{L})=0.00158$ 24; $\alpha(\text{M})=0.00034$ 5; $\alpha(\text{N}+..)=8.7\times 10^{-5}$ 13 $\alpha(\text{N})=7.5\times 10^{-5}$ 11; $\alpha(\text{O})=1.12\times 10^{-5}$ 19; $\alpha(\text{P})=6.8\times 10^{-7}$ 19 Mult.: $A_2=+0.17$ 8, $A_4=+0.01$ 12; $\alpha(\text{K})_{\text{exp}}=0.010$ 4.
529.6 5 534.0 3 535.1 1	0.3 1 0.3 2 2.1 3	2730.8 3024.2 2090.60	21/2 ⁺ 7/2 ⁺	2201.24 2490.2 1555.52	11/2 ⁻ 19/2 ⁻ 5/2 ⁻	E1	0.00338 5	$\alpha=0.00338$ 5; $\alpha(\text{K})=0.00290$ 4; $\alpha(\text{L})=0.000377$ 6; $\alpha(\text{M})=7.93\times 10^{-5}$ 12; $\alpha(\text{N}+..)=2.05\times 10^{-5}$ 3 $\alpha(\text{N})=1.768\times 10^{-5}$ 25; $\alpha(\text{O})=2.67\times 10^{-6}$ 4; $\alpha(\text{P})=1.690\times 10^{-7}$ 24 Mult.: $A_2=-0.16$ 4, $A_4=+0.01$ 6; $\alpha(\text{K})_{\text{exp}}=0.0043$ 15.
546.6 1	2.6 1	1852.56	3/2 ⁻	1305.91	1/2 ⁻	M1	0.01464	$\alpha(\text{K})=0.01253$ 18; $\alpha(\text{L})=0.001668$ 24; $\alpha(\text{M})=0.000352$ 5; $\alpha(\text{N}+..)=9.18\times 10^{-5}$ 13 $\alpha(\text{N})=7.90\times 10^{-5}$ 11; $\alpha(\text{O})=1.204\times 10^{-5}$ 17; $\alpha(\text{P})=7.96\times 10^{-7}$ 12 Mult.: $\alpha(\text{K})_{\text{exp}}=0.014$ 2.
557.0 2 563.8 1	0.3 1 16.7 1	1988.24 1305.91	11/2 ⁻ 1/2 ⁻	1431.24 742.10	11/2 ⁻ 3/2 ⁻	M1	0.01355	$\alpha(\text{K})=0.01160$ 17; $\alpha(\text{L})=0.001542$ 22; $\alpha(\text{M})=0.000326$ 5; $\alpha(\text{N}+..)=8.49\times 10^{-5}$ 12

$^{140}\text{Ce}(\alpha, n\gamma)$ 1990Wr01 (continued) $\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ	$\alpha^\dagger$	Comments
									$\alpha(\text{N})=7.30\times 10^{-5}$ 11; $\alpha(\text{O})=1.114\times 10^{-5}$ 16; $\alpha(\text{P})=7.36\times 10^{-7}$ 11 Mult.: $\alpha(\text{K})_{\text{exp}}=0.011$ 1; $\gamma(\theta)$ was used for normalization of $\gamma(\theta)$ for other γ 's.
569.2 3	0.30 [#] 15	2125.82	3/2 ⁻	1556.61	3/2 ⁺				
571.3 2	0.7 1	2590.22	11/2 ⁻	2018.92	15/2 ⁻	E2		0.00829 12	$\alpha=0.00829$ 12; $\alpha(\text{K})=0.00691$ 10; $\alpha(\text{L})=0.001082$ 16; $\alpha(\text{M})=0.000232$ 4; $\alpha(\text{N}+..)=5.95\times 10^{-5}$ 9 $\alpha(\text{N})=5.15\times 10^{-5}$ 8; $\alpha(\text{O})=7.57\times 10^{-6}$ 11; $\alpha(\text{P})=4.10\times 10^{-7}$ 6 Mult.: $\alpha(\text{K})_{\text{exp}}=0.006$ 1.
581.1 1	11.4 2	1988.24	11/2 ⁻	1407.09	9/2 ⁻	M1+E2	0.14	0.01248	$\alpha(\text{K})=0.01068$ 15; $\alpha(\text{L})=0.001422$ 20; $\alpha(\text{M})=0.000300$ 5; $\alpha(\text{N}+..)=7.82\times 10^{-5}$ 11 $\alpha(\text{N})=6.73\times 10^{-5}$ 10; $\alpha(\text{O})=1.026\times 10^{-5}$ 15; $\alpha(\text{P})=6.77\times 10^{-7}$ 10 Mult.: $A_2=-0.05$ 1, $A_4=+0.00$ 2; $\alpha(\text{K})_{\text{exp}}=0.010$ 1. Mult.: $A_2=+0.10$ 9, $A_4=+0.08$ 13.
583.8 2	0.6 1	2323.24	11/2 ⁻	1739.21	9/2 ⁻				
606.1 4	0.3 1	2405.6	(1/2 ⁻ , 3/2 ⁻)	1799.50	3/2 ⁺				
617.0 2	0.8 1	2173.67	7/2 ⁺	1556.61	3/2 ⁺	Q			
628.3 4	0.2	2035.61	7/2 ⁻	1407.09	9/2 ⁻				
631.3 3	0.10 5	2187.08	5/2 ⁻	1555.52	5/2 ⁻				
635.6 1	1.9 2	2066.85	13/2 ⁻	1431.24	11/2 ⁻	M1,E2		0.0082 19	$\alpha=0.0082$ 19; $\alpha(\text{K})=0.0070$ 17; $\alpha(\text{L})=0.00097$ 17; $\alpha(\text{M})=0.00021$ 4; $\alpha(\text{N}+..)=5.4\times 10^{-5}$ 10 $\alpha(\text{N})=4.6\times 10^{-5}$ 8; $\alpha(\text{O})=7.0\times 10^{-6}$ 13; $\alpha(\text{P})=4.3\times 10^{-7}$ 12 Mult.: $A_2=-0.18$ 5, $A_4=-0.07$ 7; $\alpha(\text{K})_{\text{exp}}=0.007$ 1.
657.0 4	0.8 [#] 2	2063.85	(7/2, 9/2)	1407.09	9/2 ⁻				
664.4 5	0.30 [#] 15	2220.72	5/2 ⁺	1556.61	3/2 ⁺				
681.7 2	0.4 1	2700.62		2018.92	15/2 ⁻				
683.5 1	2.2 2	2090.60	7/2 ⁺	1407.09	9/2 ⁻	E1		0.00199 3	$\alpha=0.00199$ 3; $\alpha(\text{K})=0.001711$ 24; $\alpha(\text{L})=0.000220$ 3; $\alpha(\text{M})=4.62\times 10^{-5}$ 7; $\alpha(\text{N}+..)=1.197\times 10^{-5}$ 17 $\alpha(\text{N})=1.031\times 10^{-5}$ 15; $\alpha(\text{O})=1.561\times 10^{-6}$ 22; $\alpha(\text{P})=1.004\times 10^{-7}$ 14 Mult.: $A_2=-0.10$ 4, $A_4=+0.00$ 6; $\alpha(\text{K})_{\text{exp}}<0.0032$ 15.
703.0 3	0.3 1	2134.44	9/2 ⁻	1431.24	11/2 ⁻				
724.6 3	0.4 1	2463.76	11/2 ⁻	1739.21	9/2 ⁻				
727.4 2	1.2 1	2134.44	9/2 ⁻	1407.09	9/2 ⁻	M1		0.00725 11	$\alpha=0.00725$ 11; $\alpha(\text{K})=0.00621$ 9; $\alpha(\text{L})=0.000819$ 12; $\alpha(\text{M})=0.0001728$ 25; $\alpha(\text{N}+..)=4.50\times 10^{-5}$ 7 $\alpha(\text{N})=3.87\times 10^{-5}$ 6; $\alpha(\text{O})=5.91\times 10^{-6}$ 9; $\alpha(\text{P})=3.92\times 10^{-7}$ 6 Mult.: $A_2=+0.19$ 6, $A_4=-0.01$ 9; $\alpha(\text{K})_{\text{exp}}=0.0066$ 8.
728.2 3	0.7 1	2283.97	7/2 ⁻	1555.52	5/2 ⁻	M1		0.00723 11	$\alpha=0.00723$ 11; $\alpha(\text{K})=0.00619$ 9; $\alpha(\text{L})=0.000817$ 12; $\alpha(\text{M})=0.0001723$ 25; $\alpha(\text{N}+..)=4.49\times 10^{-5}$ 7 $\alpha(\text{N})=3.86\times 10^{-5}$ 6; $\alpha(\text{O})=5.89\times 10^{-6}$ 9; $\alpha(\text{P})=3.91\times 10^{-7}$ 6 Mult.: $\alpha(\text{K})_{\text{exp}}=0.0066$ 8.
742.1 1	100.0 2	742.10	3/2 ⁻	0.0	7/2 ⁻	E2		0.00436 7	$\alpha=0.00436$ 7; $\alpha(\text{K})=0.00368$ 6; $\alpha(\text{L})=0.000536$ 8; $\alpha(\text{M})=0.0001143$ 16; $\alpha(\text{N}+..)=2.95\times 10^{-5}$ 5 $\alpha(\text{N})=2.55\times 10^{-5}$ 4; $\alpha(\text{O})=3.79\times 10^{-6}$ 6; $\alpha(\text{P})=2.21\times 10^{-7}$ 3 Mult.: $A_2=+0.04$ 1, $A_4=-0.01$ 2; $\alpha(\text{K})_{\text{exp}}=0.0039$ 4.
760.2 1	0.5 1	1988.24	11/2 ⁻	1228.07	13/2 ⁺				

$^{140}\text{Ce}(\alpha, n\gamma)$ **1990Wr01** (continued) $\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	$\alpha^\dagger$	Comments
769.6 3	1.1 1	2201.24	11/2 ⁻	1431.24	11/2 ⁻	D+Q		Mult.: $A_2=-0.06$ 5, $A_4=+0.04$ 9.
789.6 3	1.2 1	2196.92	7/2 ⁻	1407.09	9/2 ⁻			
790.8 1	17.2 2	2018.92	15/2 ⁻	1228.07	13/2 ⁺	E1	0.001475 21	$\alpha=0.001475$ 21; $\alpha(\text{K})=0.001270$ 18; $\alpha(\text{L})=0.0001621$ 23; $\alpha(\text{M})=3.41\times 10^{-5}$ 5; $\alpha(\text{N}+..)=8.84\times 10^{-6}$ $\alpha(\text{N})=7.61\times 10^{-6}$ 11; $\alpha(\text{O})=1.153\times 10^{-6}$ 17; $\alpha(\text{P})=7.48\times 10^{-8}$ 11 Mult.: $A_2=-0.21$ 1, $A_4=-0.02$ 2; $\alpha(\text{K})_{\text{exp}}=0.0014$ 2.
794.2 1	3.4 2	2201.24	11/2 ⁻	1407.09	9/2 ⁻	M1	0.00586 9	$\alpha=0.00586$ 9; $\alpha(\text{K})=0.00502$ 7; $\alpha(\text{L})=0.000660$ 10; $\alpha(\text{M})=0.0001394$ 20; $\alpha(\text{N}+..)=3.63\times 10^{-5}$ 5 $\alpha(\text{N})=3.12\times 10^{-5}$ 5; $\alpha(\text{O})=4.77\times 10^{-6}$ 7; $\alpha(\text{P})=3.17\times 10^{-7}$ 5 Mult.: $A_2=-0.16$ 3, $A_4=-0.01$ 4; $\alpha(\text{K})_{\text{exp}}=0.004$ 1. Mult.: $A_2=-0.09$ 9, $A_4=+0.08$ 14.
806.0 1	0.7 1	2361.54	3/2 ⁻	1555.52	5/2 ⁻	D		
810.8 5	0.2 [#] 1	2242.22	11/2 ⁺	1431.24	11/2 ⁻			
813.1 3	2.5 3	1555.52	5/2 ⁻	742.10	3/2 ⁻	M1	0.00554 8	$\alpha=0.00554$ 8; $\alpha(\text{K})=0.00475$ 7; $\alpha(\text{L})=0.000624$ 9; $\alpha(\text{M})=0.0001316$ 19; $\alpha(\text{N}+..)=3.43\times 10^{-5}$ 5 $\alpha(\text{N})=2.95\times 10^{-5}$ 5; $\alpha(\text{O})=4.50\times 10^{-6}$ 7; $\alpha(\text{P})=3.00\times 10^{-7}$ 5 Mult.: $A_2=+0.06$, $A_4=+0.02$; $\alpha(\text{K})_{\text{exp}}=0.0023$ 3.
814.5 2	9.3 1	1556.61	3/2 ⁺	742.10	3/2 ⁻	E1	0.001390 20	$\alpha=0.001390$ 20; $\alpha(\text{K})=0.001197$ 17; $\alpha(\text{L})=0.0001527$ 22; $\alpha(\text{M})=3.21\times 10^{-5}$ 5; $\alpha(\text{N}+..)=8.32\times 10^{-6}$ $\alpha(\text{N})=7.17\times 10^{-6}$ 10; $\alpha(\text{O})=1.086\times 10^{-6}$ 16; $\alpha(\text{P})=7.06\times 10^{-8}$ 10
817.3 5	0.2 [#] 1	2805.4	13/2 ⁺	1988.24	11/2 ⁻			
817.9 3	0.5 1	2249.33	11/2 ⁻	1431.24	11/2 ⁻			
835.1 2	1.2 3	2242.22	11/2 ⁺	1407.09	9/2 ⁻	E1	0.001323 19	$\alpha=0.001323$ 19; $\alpha(\text{K})=0.001140$ 16; $\alpha(\text{L})=0.0001452$ 21; $\alpha(\text{M})=3.05\times 10^{-5}$ 5; $\alpha(\text{N}+..)=7.91\times 10^{-6}$ $\alpha(\text{N})=6.81\times 10^{-6}$ 10; $\alpha(\text{O})=1.033\times 10^{-6}$ 15; $\alpha(\text{P})=6.72\times 10^{-8}$ 10 Mult.: $\alpha(\text{K})_{\text{exp}}<0.0013$ 5.
838.3 5	0.2 [#] 1	2577.85	11/2,13/2	1739.21	9/2 ⁻			
838.8 1	3.5 3	2066.85	13/2 ⁻	1228.07	13/2 ⁺	E1	0.001312 19	$\alpha=0.001312$ 19; $\alpha(\text{K})=0.001130$ 16; $\alpha(\text{L})=0.0001439$ 21; $\alpha(\text{M})=3.02\times 10^{-5}$ 5; $\alpha(\text{N}+..)=7.84\times 10^{-6}$ $\alpha(\text{N})=6.75\times 10^{-6}$ 10; $\alpha(\text{O})=1.024\times 10^{-6}$ 15; $\alpha(\text{P})=6.66\times 10^{-8}$ 10 Mult.: $A_2=+0.31$ 4, $A_4=+0.03$ 6; $\alpha(\text{K})_{\text{exp}}=0.0015$ 5.
842.2 2	2.4 5	2249.33	11/2 ⁻	1407.09	9/2 ⁻	D		
843.5 3	0.6 1	2451.81	1/2,3/2	1608.39	1/2 ⁺			
847.1 1	5.5 5	2075.15	11/2 ⁻	1228.07	13/2 ⁺	E1	0.001286 18	$\alpha=0.001286$ 18; $\alpha(\text{K})=0.001108$ 16; $\alpha(\text{L})=0.0001411$ 20; $\alpha(\text{M})=2.96\times 10^{-5}$ 5; $\alpha(\text{N}+..)=7.69\times 10^{-6}$ $\alpha(\text{N})=6.62\times 10^{-6}$ 10; $\alpha(\text{O})=1.004\times 10^{-6}$ 14; $\alpha(\text{P})=6.54\times 10^{-8}$ 10 Mult.: $A_2=-0.10$ 1, $A_4=-0.04$ 3; $\alpha(\text{K})_{\text{exp}}=0.0012$ 2.
849 1	0.30 [#] 15	2405.53	5/2	1556.61	3/2 ⁺			
849.6 3	1.0 1	2405.53	5/2	1555.52	5/2 ⁻			
863.5 4	0.10 [#] 5	2294.57	13/2 ⁻	1431.24	11/2 ⁻			
866.3 2	6.0 1	1608.39	1/2 ⁺	742.10	3/2 ⁻	E1	0.001231 18	$\alpha=0.001231$ 18; $\alpha(\text{K})=0.001060$ 15; $\alpha(\text{L})=0.0001349$ 19; $\alpha(\text{M})=2.83\times 10^{-5}$ 4; $\alpha(\text{N}+..)=7.35\times 10^{-6}$

¹⁴⁰Ce(α ,n γ) **1990Wr01** (continued)

$\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	$\alpha^\dagger$	Comments
866.3 1	3.5 10	2094.41	11/2 ⁻	1228.07	13/2 ⁺	E1	0.001231 18	$\alpha(\text{N})=6.33\times 10^{-6}$ 9; $\alpha(\text{O})=9.60\times 10^{-7}$ 14; $\alpha(\text{P})=6.26\times 10^{-8}$ 9 Mult.: $A_2=-0.05$ 2, $A_4=+0.02$ 3; $\alpha(\text{K})_{\text{exp}}=0.0010$ 2. $\alpha=0.001231$ 18; $\alpha(\text{K})=0.001060$ 15; $\alpha(\text{L})=0.0001349$ 19; $\alpha(\text{M})=2.83\times 10^{-5}$ 4; $\alpha(\text{N}+..)=7.35\times 10^{-6}$
877.8 5	0.2 [#] 1	2433.4	5/2 ⁻	1555.52	5/2 ⁻			$\alpha(\text{N})=6.33\times 10^{-6}$ 9; $\alpha(\text{O})=9.60\times 10^{-7}$ 14; $\alpha(\text{P})=6.26\times 10^{-8}$ 9 Mult.: $A_2=-0.13$ 1, $A_4=-0.01$ 1; $\alpha(\text{K})_{\text{exp}}=0.0010$ 2.
892.0 1	1.4 2	2323.24	11/2 ⁻	1431.24	11/2 ⁻	M1,E2	0.0037 8	$\alpha=0.0037$ 8; $\alpha(\text{K})=0.0031$ 7; $\alpha(\text{L})=0.00042$ 8; $\alpha(\text{M})=8.9\times 10^{-5}$ 17; $\alpha(\text{N}+..)=2.3\times 10^{-5}$ 5 $\alpha(\text{N})=2.0\times 10^{-5}$ 4; $\alpha(\text{O})=3.0\times 10^{-6}$ 6; $\alpha(\text{P})=1.9\times 10^{-7}$ 5 Mult.: $A_2=+0.22$ 6, $A_4=-0.02$ 10; $\alpha(\text{K})_{\text{exp}}=0.0032$ 6.
910.6 5	0.7 1	2317.9	(7/2)	1407.09	9/2 ⁻			
916.0 5	0.50 [#] 25	2347.12	9/2 ⁽⁻⁾	1431.24	11/2 ⁻			
916.5 3	0.3 1	2323.24	11/2 ⁻	1407.09	9/2 ⁻			
940.1 5	0.7 [#] 3	2347.12	9/2 ⁽⁻⁾	1407.09	9/2 ⁻			
949.9 3	0.4 1	2255.76	3/2 ⁻ , 1/2 ⁻ , (5/2 ⁻)	1305.91	1/2 ⁻			
954.8 5	0.2 1	2943.0	(13/2)	1988.24	11/2 ⁻			
967.4 1	1.6 2	2398.63	9/2 ⁻	1431.24	11/2 ⁻	M1,E2	0.0030 7	$\alpha=0.0030$ 7; $\alpha(\text{K})=0.0026$ 6; $\alpha(\text{L})=0.00035$ 7; $\alpha(\text{M})=7.3\times 10^{-5}$ 14; $\alpha(\text{N}+..)=1.9\times 10^{-5}$ 4 $\alpha(\text{N})=1.6\times 10^{-5}$ 3; $\alpha(\text{O})=2.5\times 10^{-6}$ 5; $\alpha(\text{P})=1.6\times 10^{-7}$ 4 Mult.: $A_2=+0.06$ 8, $A_4=+0.02$ 12; $\alpha(\text{K})_{\text{exp}}=0.0023$ 4.
973.3 4	0.30 [#] 15	2528.17	7/2 ⁻	1555.52	5/2 ⁻	D		
995.2 1	2.0 2	2223.23	13/2 ⁻	1228.07	13/2 ⁺	E1	0.000943 14	$\alpha=0.000943$ 14; $\alpha(\text{K})=0.000813$ 12; $\alpha(\text{L})=0.0001029$ 15; $\alpha(\text{M})=2.16\times 10^{-5}$ 3; $\alpha(\text{N}+..)=5.61\times 10^{-6}$ $\alpha(\text{N})=4.83\times 10^{-6}$ 7; $\alpha(\text{O})=7.33\times 10^{-7}$ 11; $\alpha(\text{P})=4.81\times 10^{-8}$ 7 Mult.: $A_2=+0.34$ 5, $A_4=-0.02$ 8; $\alpha(\text{K})_{\text{exp}}=0.00086$ 10.
1012.1 3	0.4 1	2443.31	9/2 ⁻	1431.24	11/2 ⁻			
1014.2 2	2.0 2	2242.22	11/2 ⁺	1228.07	13/2 ⁺	M1	0.00328 5	$\alpha=0.00328$ 5; $\alpha(\text{K})=0.00281$ 4; $\alpha(\text{L})=0.000367$ 6; $\alpha(\text{M})=7.73\times 10^{-5}$ 11; $\alpha(\text{N}+..)=2.01\times 10^{-5}$ 3 $\alpha(\text{N})=1.733\times 10^{-5}$ 25; $\alpha(\text{O})=2.65\times 10^{-6}$ 4; $\alpha(\text{P})=1.768\times 10^{-7}$ 25 Mult.: $A_2=-0.16$ 2, $A_4=+0.04$ 3; $\alpha(\text{K})_{\text{exp}}=0.0034$ 12.
1017.1 3	1.0 1	2322.9	1/2 ⁻ , 3/2 ⁻	1305.91	1/2 ⁻	D		
1020.6 3	0.5 2	2451.9		1431.24	11/2 ⁻			
1032.7 2	3.0 3	1774.88	1/2 ⁺	742.10	3/2 ⁻	E1	0.000880 13	$\alpha=0.000880$ 13; $\alpha(\text{K})=0.000759$ 11; $\alpha(\text{L})=9.59\times 10^{-5}$ 14; $\alpha(\text{M})=2.01\times 10^{-5}$ 3; $\alpha(\text{N}+..)=5.23\times 10^{-6}$ 8 $\alpha(\text{N})=4.50\times 10^{-6}$ 7; $\alpha(\text{O})=6.84\times 10^{-7}$ 10; $\alpha(\text{P})=4.49\times 10^{-8}$ 7 Mult.: $A_2=-0.03$ 5, $A_4=-0.11$ 8; $\alpha(\text{K})_{\text{exp}}=0.0015$ 3.
1032.8 5	0.2 1	2463.76	11/2 ⁻	1431.24	11/2 ⁻			
1033.0 5	0.2 1	2884.5		1851.5	7/2 ⁻			
1048.8 5	0.4 [#] 2	2788.0		1739.21	9/2 ⁻			
1055.7 3	0.9 1	2361.54	3/2 ⁻	1305.91	1/2 ⁻	(M1)	0.00298 5	$\alpha=0.00298$ 5; $\alpha(\text{K})=0.00256$ 4; $\alpha(\text{L})=0.000334$ 5; $\alpha(\text{M})=7.03\times 10^{-5}$

¹⁴⁰Ce(α ,n γ) **1990Wr01** (continued)

$\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ	$\alpha^\dagger$	Comments
1056.4 3	0.8 1	2463.76	11/2 ⁻	1407.09	9/2 ⁻	M1		0.00298 5	10; $\alpha(\text{N}+..)=1.83\times 10^{-5}$ 3 $\alpha(\text{N})=1.575\times 10^{-5}$ 22; $\alpha(\text{O})=2.41\times 10^{-6}$ 4; $\alpha(\text{P})=1.608\times 10^{-7}$ 23 Mult.: $\alpha(\text{K})_{\text{exp}}=0.0023$ 6. $\alpha=0.00298$ 5; $\alpha(\text{K})=0.00256$ 4; $\alpha(\text{L})=0.000333$ 5; $\alpha(\text{M})=7.02\times 10^{-5}$ 10; $\alpha(\text{N}+..)=1.83\times 10^{-5}$ 3 $\alpha(\text{N})=1.573\times 10^{-5}$ 22; $\alpha(\text{O})=2.40\times 10^{-6}$ 4; $\alpha(\text{P})=1.606\times 10^{-7}$ 23 Mult.: $\alpha(\text{K})_{\text{exp}}=0.0023$ 6.
1057.5 2	4.5 5	1799.50	3/2 ⁺	742.10	3/2 ⁻	E1		0.000842 12	$\alpha=0.000842$ 12; $\alpha(\text{K})=0.000726$ 11; $\alpha(\text{L})=9.17\times 10^{-5}$ 13; $\alpha(\text{M})=1.92\times 10^{-5}$ 3; $\alpha(\text{N}+..)=5.00\times 10^{-6}$ 7 $\alpha(\text{N})=4.30\times 10^{-6}$ 6; $\alpha(\text{O})=6.54\times 10^{-7}$ 10; $\alpha(\text{P})=4.30\times 10^{-8}$ 6 Mult.: $A_2=+0.01$ 3, $A_4=+0.01$ 4; $\alpha(\text{K})_{\text{exp}}=0.0023$ 6.
1065.4 5	0.30 [#] 15	2496.19	7/2 ⁻	1431.24	11/2 ⁻	(E2)		0.00193 3	$\alpha=0.00193$ 3; $\alpha(\text{K})=0.001646$ 23; $\alpha(\text{L})=0.000224$ 4; $\alpha(\text{M})=4.74\times 10^{-5}$ 7; $\alpha(\text{N}+..)=1.227\times 10^{-5}$ 18 $\alpha(\text{N})=1.058\times 10^{-5}$ 15; $\alpha(\text{O})=1.595\times 10^{-6}$ 23; $\alpha(\text{P})=9.98\times 10^{-8}$ 14 Mult.: $A_2=+0.2$ 1, $A_4=-0.08$ 15; $\alpha(\text{K})_{\text{exp}}=0.0021$ 5.
1066.8 3	0.3 1	2294.57	13/2 ⁻	1228.07	13/2 ⁺				
1073.6 3	1.2 2	2504.68	(15/2) ⁻	1431.24	11/2 ⁻				
1089.0 2	0.4 [#] 2	2496.19	7/2 ⁻	1407.09	9/2 ⁻	M1+E2	≈ 0.20	≈ 0.00262	$\alpha\approx 0.00262$; $\alpha(\text{K})\approx 0.00225$; $\alpha(\text{L})\approx 0.000293$; $\alpha(\text{M})\approx 6.17\times 10^{-5}$ $\alpha(\text{N})\approx 1.382\times 10^{-5}$; $\alpha(\text{O})\approx 2.11\times 10^{-6}$; $\alpha(\text{P})\approx 1.409\times 10^{-7}$; $\alpha(\text{IPF})\approx 5.19\times 10^{-7}$ Mult.: $A_2=+0.27$ 4, $A_4=+0.07$ 5; $\alpha(\text{K})_{\text{exp}}=0.0020$ 3. Mult.: $A_2=-0.33$ 9, $A_4=-0.01$ 14.
1110.5 1	5.1 2	1852.56	3/2 ⁻	742.10	3/2 ⁻				
1114.2 2	1.0 1	2420.12	3/2 ⁻	1305.91	1/2 ⁻	D			
1120.9 2	0.9 1	2528.17	7/2 ⁻	1407.09	9/2 ⁻				
1131.3 5	0.2 [#] 1	2359.67	15/2 ⁺	1228.07	13/2 ⁺				
1145.8 3	0.4 1	2451.81	1/2,3/2	1305.91	1/2 ⁻				
1146.5 5	0.30 [#] 15	2577.85	11/2,13/2	1431.24	11/2 ⁻				
1159.0 5	0.3 1	2590.22	11/2 ⁻	1431.24	11/2 ⁻				
1181 1	0.30 [#] 15	2588.05	5/2 ⁻	1407.09	9/2 ⁻	[E3]			$\alpha=0.00293$ 5; $\alpha(\text{K})=0.00247$ 4; $\alpha(\text{L})=0.000365$ 6; $\alpha(\text{M})=7.80\times 10^{-5}$ 11; $\alpha(\text{N}+..)=2.27\times 10^{-5}$ 4 $\alpha(\text{N})=1.741\times 10^{-5}$ 25; $\alpha(\text{O})=2.61\times 10^{-6}$ 4; $\alpha(\text{P})=1.551\times 10^{-7}$ 22; $\alpha(\text{IPF})=2.52\times 10^{-6}$ 4 Additional information 1. Mult.: $A_2=+0.54$ 1, $A_4=+0.03$ 1; ce was used for normalization of $\alpha(\text{K})_{\text{exp}}$.
1223.9 2	0.8 1	2529.82	3/2 ⁻	1305.91	1/2 ⁻				
1228.1 1	54.4 2	1228.07	13/2 ⁺	0.0	7/2 ⁻				
1236.0 5	0.2 1	2463.76	11/2 ⁻	1228.07	13/2 ⁺				
1241.0 2	1.2 1	2672.22	(9/2 ⁻)	1431.24	11/2 ⁻	E1			$\alpha=0.000672$ 10; $\alpha(\text{K})=0.000534$ 8; $\alpha(\text{L})=6.70\times 10^{-5}$ 10; $\alpha(\text{M})=1.405\times 10^{-5}$ 20; $\alpha(\text{N}+..)=5.67\times 10^{-5}$ 9
1254.0 5	0.6 1	1996.40	5/2 ⁺	742.10	3/2 ⁻				

$^{140}\text{Ce}(\alpha, n\gamma)$ **1990Wr01 (continued)** $\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ	$\alpha^\dagger$	Comments
1255.0 1	1.8 2	2483.07	17/2 ⁺	1228.07	13/2 ⁺	E2		0.001416 20	$\alpha(\text{N})=3.14\times 10^{-6}$ 5; $\alpha(\text{O})=4.78\times 10^{-7}$ 7; $\alpha(\text{P})=3.17\times 10^{-8}$ 5; $\alpha(\text{IPF})=5.30\times 10^{-5}$ 8 Mult.: $A_2=+0.15$ 6, $A_4=-0.03$ 9; $\alpha(\text{K})_{\text{exp}}=0.0010$ 2. $\alpha=0.001416$ 20; $\alpha(\text{K})=0.001200$ 17; $\alpha(\text{L})=0.0001599$ 23; $\alpha(\text{M})=3.38\times 10^{-5}$ 5; $\alpha(\text{N}+..)=2.21\times 10^{-5}$ $\alpha(\text{N})=7.54\times 10^{-6}$ 11; $\alpha(\text{O})=1.142\times 10^{-6}$ 16; $\alpha(\text{P})=7.28\times 10^{-8}$ 11; $\alpha(\text{IPF})=1.330\times 10^{-5}$ 19 Mult.: $A_2=+0.15$ 6, $A_4=-0.03$ 9; $\alpha(\text{K})_{\text{exp}}=0.0010$ 2. Mult.: $A_2=-0.02$ 3, $A_4=+0.06$ 5.
1262.7 1	2.2 2	2004.81	1/2 ⁻	742.10	3/2 ⁻	D			
1265.0 5	0.2 [#] 1	2672.22	(9/2 ⁻)	1407.09	9/2 ⁻				
1282.1 2	0.30 [#] 15	2588.05	5/2 ⁻	1305.91	1/2 ⁻				
1293.6 2	1.9 2	2035.61	7/2 ⁻	742.10	3/2 ⁻	Q			Mult.: $A_2=+0.10$ 6, $A_4=+0.01$ 9.
1319.0 5	1.0 1	2750.0	13/2 ⁻	1431.24	11/2 ⁻				
1327.5 5	0.3 1	2759.2		1431.24	11/2 ⁻				
1342.6 5	0.2 [#] 1	2750.0	13/2 ⁻	1407.09	9/2 ⁻				
1352.5 5	0.6 [#] 3	2759.2		1407.09	9/2 ⁻				
1367.0 3	0.2 [#] 1	2798.2		1431.24	11/2 ⁻				
1374.5 5	0.7 2	2805.4	13/2 ⁺	1431.24	11/2 ⁻				
1378.0 3	0.6 2	2785.1		1407.09	9/2 ⁻				
1378.4 3	0.6 1	2684.0	3/2 ⁻	1305.91	1/2 ⁻				
1383.7 1	2.5 2	2125.82	3/2 ⁻	742.10	3/2 ⁻	M1+E2	>0.33	0.00140 20	$\alpha=0.00140$ 20; $\alpha(\text{K})=0.00116$ 18; $\alpha(\text{L})=0.000152$ 22; $\alpha(\text{M})=3.2\times 10^{-5}$ 5; $\alpha(\text{N}+..)=4.94\times 10^{-5}$ 21 $\alpha(\text{N})=7.2\times 10^{-6}$ 10; $\alpha(\text{O})=1.09\times 10^{-6}$ 16; $\alpha(\text{P})=7.2\times 10^{-8}$ 12; $\alpha(\text{IPF})=4.11\times 10^{-5}$ 10 Mult.: $A_2=-0.18$ 5, $A_4=+0.06$ 10.
1392.8 3	0.30 [#] 15	2799.9		1407.09	9/2 ⁻				
1407.0 1	47.9 2	1407.09	9/2 ⁻	0.0	7/2 ⁻	M1+E2	0.65	0.001462 21	$\alpha=0.001462$ 21; $\alpha(\text{K})=0.001214$ 17; $\alpha(\text{L})=0.0001575$ 22; $\alpha(\text{M})=3.32\times 10^{-5}$ 5; $\alpha(\text{N}+..)=5.70\times 10^{-5}$ $\alpha(\text{N})=7.43\times 10^{-6}$ 11; $\alpha(\text{O})=1.134\times 10^{-6}$ 16; $\alpha(\text{P})=7.54\times 10^{-8}$ 11; $\alpha(\text{IPF})=4.84\times 10^{-5}$ 7 Mult.: $A_2=+0.49$ 1, $A_4=+0.06$ 1; $\alpha(\text{K})_{\text{exp}}=0.0012$ 1. $\alpha=0.001136$ 16; $\alpha(\text{K})=0.000928$ 13; $\alpha(\text{L})=0.0001219$ 17; $\alpha(\text{M})=2.57\times 10^{-5}$ 4; $\alpha(\text{N}+..)=6.08\times 10^{-5}$ $\alpha(\text{N})=5.74\times 10^{-6}$ 8; $\alpha(\text{O})=8.71\times 10^{-7}$ 13; $\alpha(\text{P})=5.63\times 10^{-8}$ 8; $\alpha(\text{IPF})=5.41\times 10^{-5}$ 8 Mult.: $A_2=+0.33$ 1, $A_4=-0.09$ 2; ce was used for normalization of $\alpha(\text{K})_{\text{exp}}$. Mult.: $A_2=-0.24$ 4, $A_4=-0.08$ 8.
1431.2 1	31.9 1	1431.24	11/2 ⁻	0.0	7/2 ⁻	[E2]		0.001136 16	
1445.0 1	3.1 2	2187.08	5/2 ⁻	742.10	3/2 ⁻	D			
1478.3 5	0.30 [#] 15	2220.72	5/2 ⁺	742.10	3/2 ⁻				
1479.0 5	0.2 [#] 1	2886.1		1407.09	9/2 ⁻				

¹⁴⁰Ce($\alpha, n\gamma$) **1990Wr01** (continued) $\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ	$\alpha^\dagger$	Comments
1480.5 5	0.4 [#] 2	2911.7		1431.24	11/2 ⁻				
1513.6 1	3.7 3	2255.76	3/2 ⁻ , 1/2 ⁻ , (5/2 ⁻)	742.10	3/2 ⁻	M1,E2		0.00122 17	$\alpha=0.00122$ 17; $\alpha(\text{K})=0.00098$ 15; $\alpha(\text{L})=0.000127$ 18; $\alpha(\text{M})=2.7\times 10^{-5}$ 4; $\alpha(\text{N}+..)=9.0\times 10^{-5}$ 4 $\alpha(\text{N})=6.0\times 10^{-6}$ 9; $\alpha(\text{O})=9.1\times 10^{-7}$ 14; $\alpha(\text{P})=6.0\times 10^{-8}$ 10; $\alpha(\text{IPF})=8.3\times 10^{-5}$ 3 Mult.: $A_2=-0.06$ 6, $A_4=+0.07$ 10.
1542.0 2	1.3 2	2283.97	7/2 ⁻	742.10	3/2 ⁻				
1555.5 1	22.7 1	1555.52	5/2 ⁻	0.0	7/2 ⁻	M1+E2	0.23	0.001312 19	$\alpha=0.001312$ 19; $\alpha(\text{K})=0.001041$ 15; $\alpha(\text{L})=0.0001341$ 19; $\alpha(\text{M})=2.82\times 10^{-5}$ 4; $\alpha(\text{N}+..)=0.000108$ $\alpha(\text{N})=6.33\times 10^{-6}$ 9; $\alpha(\text{O})=9.67\times 10^{-7}$ 14; $\alpha(\text{P})=6.49\times 10^{-8}$ 9; $\alpha(\text{IPF})=0.0001014$ 15 Mult.: $A_2=+0.09$ 2, $A_4=-0.04$ 4; $\alpha(\text{K})_{\text{exp}}=0.0011$ 2.
1576.7 5	1.0 5	2805.4	13/2 ⁺	1228.07	13/2 ⁺				
1620 1	0.5 2	2361.54	3/2 ⁻	742.10	3/2 ⁻				
1663.0 5	0.6 1	2405.53	5/2	742.10	3/2 ⁻				
1663.5 2	1.4 5	2891.58		1228.07	13/2 ⁺				
1678.0 5	0.8 [#] 3	2420.12	3/2 ⁻	742.10	3/2 ⁻				
1691.4 5	1.3 2	2433.4	5/2 ⁻	742.10	3/2 ⁻	D			Mult.: $A_2=-0.35$ 5, $A_4=-0.13$ 20.
1717.9 2	0.9 1	2460.05	5/2 ⁻	742.10	3/2 ⁻				
1739.2 1	15.0 1	1739.21	9/2 ⁻	0.0	7/2 ⁻	M1+E2	0.65	0.001073 15	$\alpha=0.001073$ 15; $\alpha(\text{K})=0.000769$ 11; $\alpha(\text{L})=9.88\times 10^{-5}$ 14; $\alpha(\text{M})=2.08\times 10^{-5}$ 3; $\alpha(\text{N}+..)=0.000185$ 3 $\alpha(\text{N})=4.66\times 10^{-6}$ 7; $\alpha(\text{O})=7.11\times 10^{-7}$ 10; $\alpha(\text{P})=4.76\times 10^{-8}$ 7; $\alpha(\text{IPF})=0.000180$ 3 Mult.: $A_2=+0.48$ 2, $A_4=+0.09$ 3.
1754.1 2	1.3 2	2496.19	7/2 ⁻	742.10	3/2 ⁻				
1786.1 5	0.6 [#] 2	2528.17	7/2 ⁻	742.10	3/2 ⁻				
1846.0 3	0.50 [#] 25	2588.05	5/2 ⁻	742.10	3/2 ⁻				
1851.5 3	6.0 5	1851.5	7/2 ⁻	0.0	7/2 ⁻	M1+E2	>0.65	0.00095 7	$\alpha=0.00095$ 7; $\alpha(\text{K})=0.00062$ 6; $\alpha(\text{L})=8.0\times 10^{-5}$ 7; $\alpha(\text{M})=1.68\times 10^{-5}$ 14; $\alpha(\text{N}+..)=0.000232$ 8 $\alpha(\text{N})=3.8\times 10^{-6}$ 4; $\alpha(\text{O})=5.7\times 10^{-7}$ 5; $\alpha(\text{P})=3.8\times 10^{-8}$ 4; $\alpha(\text{IPF})=0.000227$ 7 Mult.: $A_2=-0.13$ 2, $A_4=-0.07$ 4.
1852.4 4	3.4 4	1852.56	3/2 ⁻	0.0	7/2 ⁻				
1910.8 1	8.5 3	1910.83	5/2 ⁻	0.0	7/2 ⁻	M1+E2	0.33	0.001028 15	$\alpha=0.001028$ 15; $\alpha(\text{K})=0.000656$ 10; $\alpha(\text{L})=8.39\times 10^{-5}$ 12; $\alpha(\text{M})=1.766\times 10^{-5}$ 25; $\alpha(\text{N}+..)=0.000271$ $\alpha(\text{N})=3.96\times 10^{-6}$ 6; $\alpha(\text{O})=6.05\times 10^{-7}$ 9; $\alpha(\text{P})=4.07\times 10^{-8}$ 6; $\alpha(\text{IPF})=0.000267$ 4 Mult.: $A_2=-0.29$ 3, $A_4=-0.02$ 4.
1920.1 3	0.8 1	2662.2	3/2 ⁻	742.10	3/2 ⁻				
1941.0 5	1.1 1	2684.0	3/2 ⁻	742.10	3/2 ⁻				
1988.3 3	1.2 7	1988.24	11/2 ⁻	0.0	7/2 ⁻				Mult.: $A_2=+0.18$ 10, $A_4=+0.05$ 16.
1996.4 1	5.4	1996.40	5/2 ⁺	0.0	7/2 ⁻				Mult.: $A_2=-0.06$ 4, $A_4=+0.03$ 6.

$^{140}\text{Ce}(\alpha, n\gamma)$ **1990Wr01** (continued) $\gamma(^{143}\text{Nd})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ	$\alpha^\dagger$	Comments
2011.3 3	7.6 6	2011.3	9/2 ⁺	0.0	7/2 ⁻	(D)			Mult.: $A_2=-0.18$ 2, $A_4=+0.05$ 5.
2035.7 3	3.5 2	2035.61	7/2 ⁻	0.0	7/2 ⁻	(D+Q)			Mult.: $A_2=+0.13$ 5, $A_4=-0.15$ 7.
2063.7 3	7.7 8	2063.85	(7/2, 9/2)	0.0	7/2 ⁻				Mult.: $A_2=+0.35$ 3, $A_4=+0.09$ 5.
2090.4 3	0.8 4	2090.60	7/2 ⁺	0.0	7/2 ⁻				
2094.4 3	4.0 7	2094.41	11/2 ⁻	0.0	7/2 ⁻	Q			Mult.: $A_2=+0.16$ 2, $A_4=-0.09$ 4.
2125.6 4	0.8 1	2125.82	3/2 ⁻	0.0	7/2 ⁻				
2134.5 3	4.8 4	2134.44	9/2 ⁻	0.0	7/2 ⁻	D+Q			Mult.: $A_2=+0.56$ 4, $A_4=+0.10$ 6.
2173.7 2	3.8 3	2173.67	7/2 ⁺	0.0	7/2 ⁻	D+Q			Mult.: $A_2=+0.15$ 5, $A_4=+0.33$ 8.
2196.9 2	3.4 3	2196.92	7/2 ⁻	0.0	7/2 ⁻	D+Q			Mult.: $A_2=+0.35$ 7, $A_4=-0.14$ 10.
2220.7 2	3.2 3	2220.72	5/2 ⁺	0.0	7/2 ⁻				
2256.3 3	1.2 2	2255.76	3/2 ⁻ , 1/2 ⁻ , (5/2 ⁻)	0.0	7/2 ⁻	D			Mult.: $A_2=-0.61$ 9, $A_4=+0.25$ 18.
2283.9 3	1.9 2	2283.97	7/2 ⁻	0.0	7/2 ⁻				
2318.0 5	3.0 3	2317.9	(7/2)	0.0	7/2 ⁻				
2323.6 4	1.3 7	2323.24	11/2 ⁻	0.0	7/2 ⁻	Q			Mult.: $A_2=+0.07$ 12, $A_4=+0.43$ 19.
2347.0 2	1.6 2	2347.12	9/2 ⁽⁻⁾	0.0	7/2 ⁻	M1+E2	>0.23	0.00094 6	$\alpha=0.00094$ 6; $\alpha(\text{K})=0.00040$ 3; $\alpha(\text{L})=5.1\times 10^{-5}$ 4; $\alpha(\text{M})=1.06\times 10^{-5}$ 8; $\alpha(\text{N}+..)=0.000480$ 22 $\alpha(\text{N})=2.38\times 10^{-6}$ 18; $\alpha(\text{O})=3.6\times 10^{-7}$ 3; $\alpha(\text{P})=2.44\times 10^{-8}$ 20; $\alpha(\text{IPF})=0.000477$ 21 Mult.: $A_2=-0.70$ 10, $A_4=+0.05$ 15. Mult.: $A_2=-0.24$ 5, $A_4=-0.02$ 8.
2398.6 2	4.1 4	2398.63	9/2 ⁻	0.0	7/2 ⁻				
2405.8 3	1.9 2	2405.53	5/2	0.0	7/2 ⁻				
2415.5 3	2.0 2	2415.5		0.0	7/2 ⁻				
2434 1	2.7 3	2433.4	5/2 ⁻	0.0	7/2 ⁻				
2460.1 3	1.2 1	2460.05	5/2 ⁻	0.0	7/2 ⁻				
2557.0 5	4.6 3	2557.0	(9/2) ⁺	0.0	7/2 ⁻	D			Mult.: $A_2=-0.26$ 5, $A_4=-0.07$ 10.

[†] Additional information 2.[‡] From $\gamma(\theta)$ and $\alpha(\text{K})_{\text{exp}}$.

Deduced from coin spectrum. Uncertainty <50%.

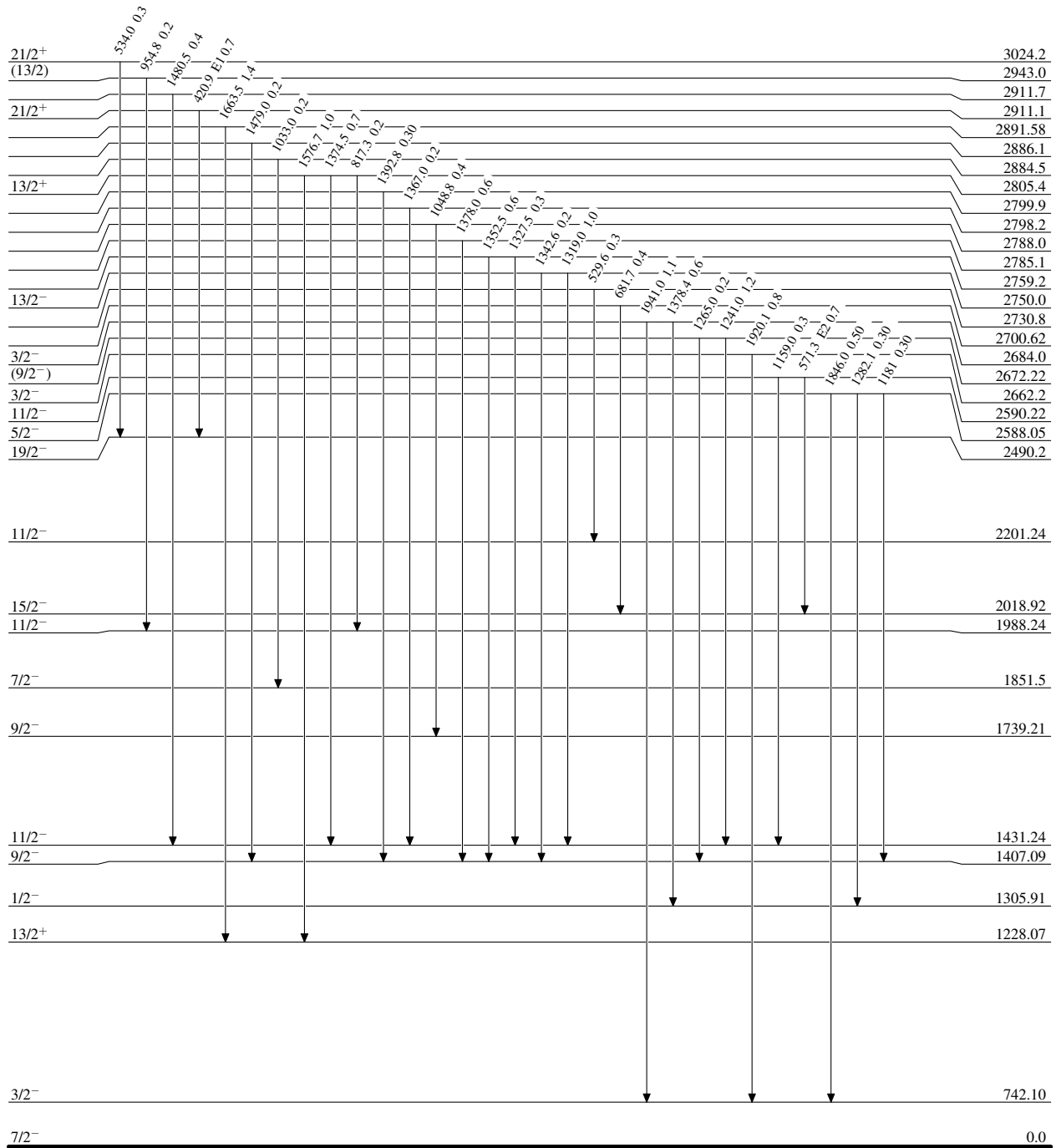
$^{140}\text{Ce}(\alpha, n\gamma)$ 1990Wr01

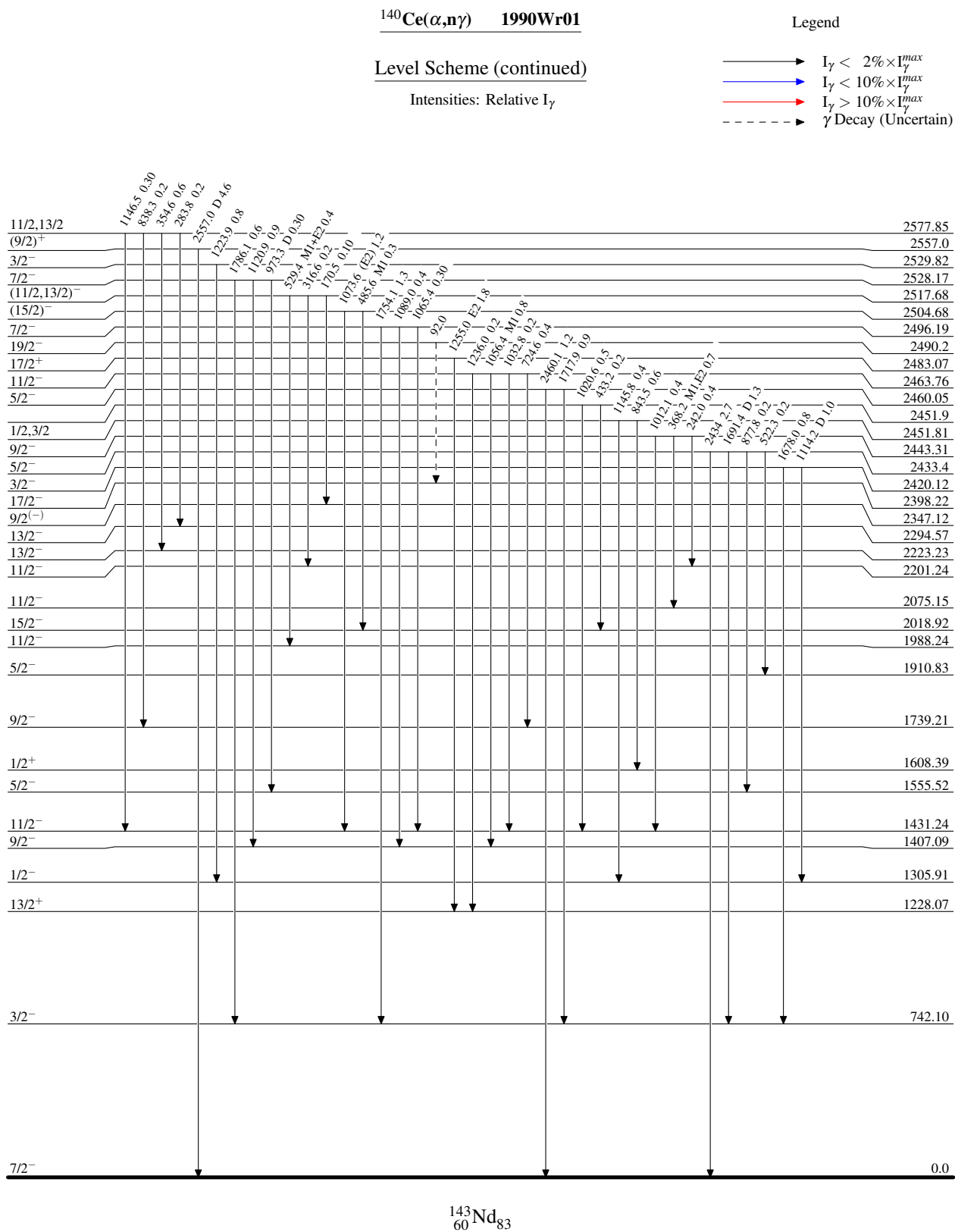
Level Scheme

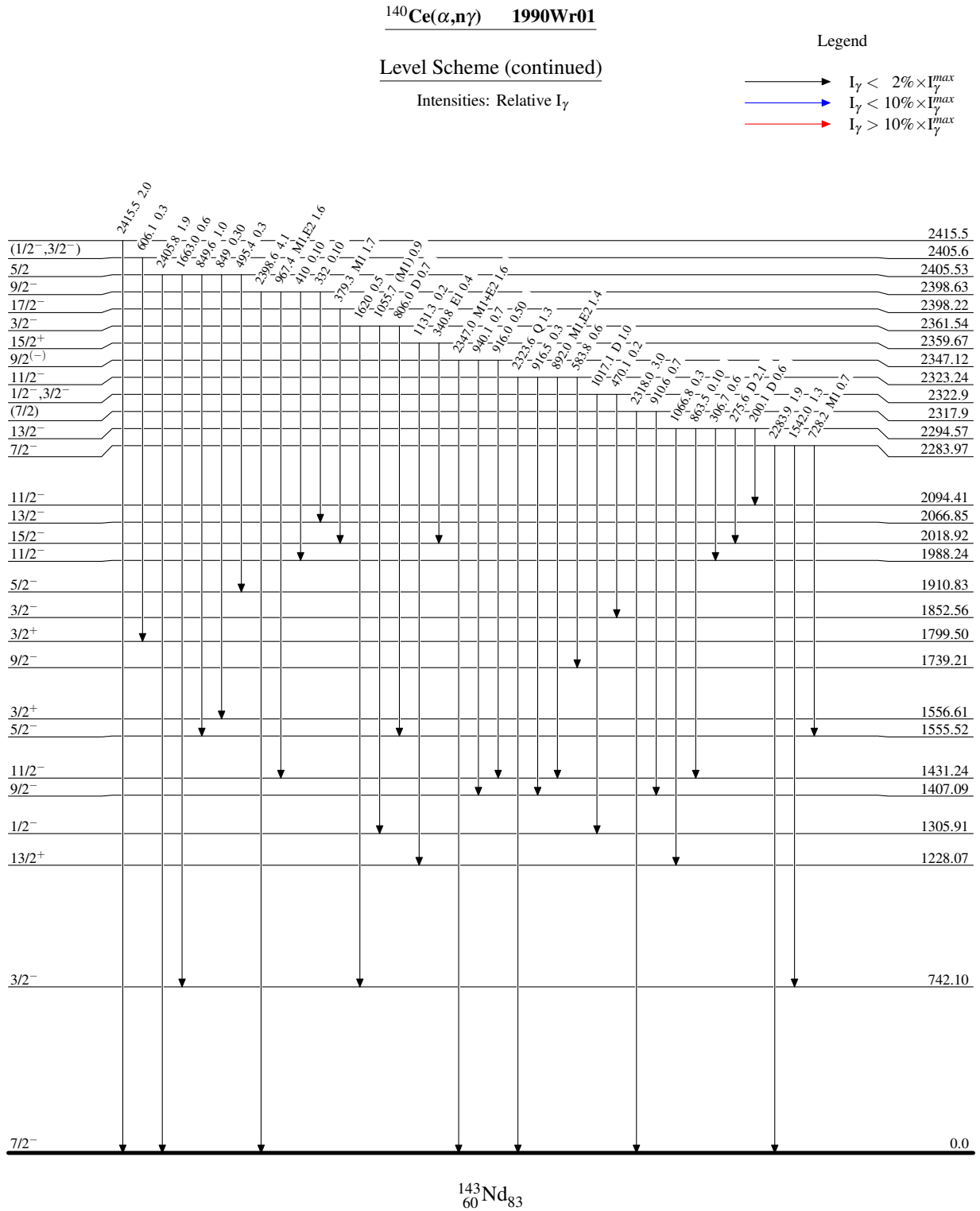
Intensities: Relative I_γ

Legend

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

 $^{143}_{60}\text{Nd}_{83}$





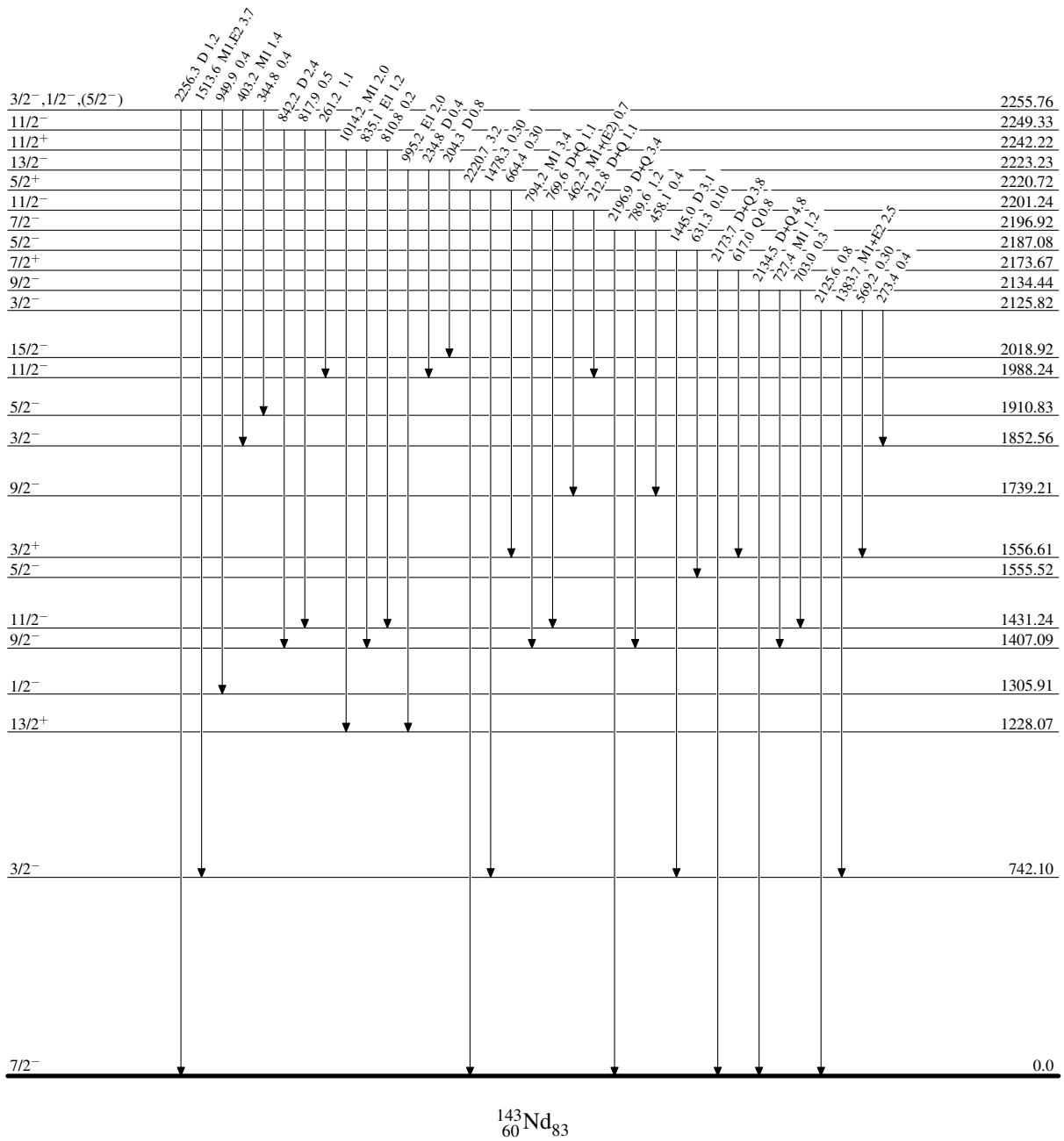
$^{140}\text{Ce}(\alpha, n\gamma)$ 1990Wr01

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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

 $^{143}_{60}\text{Nd}_{83}$

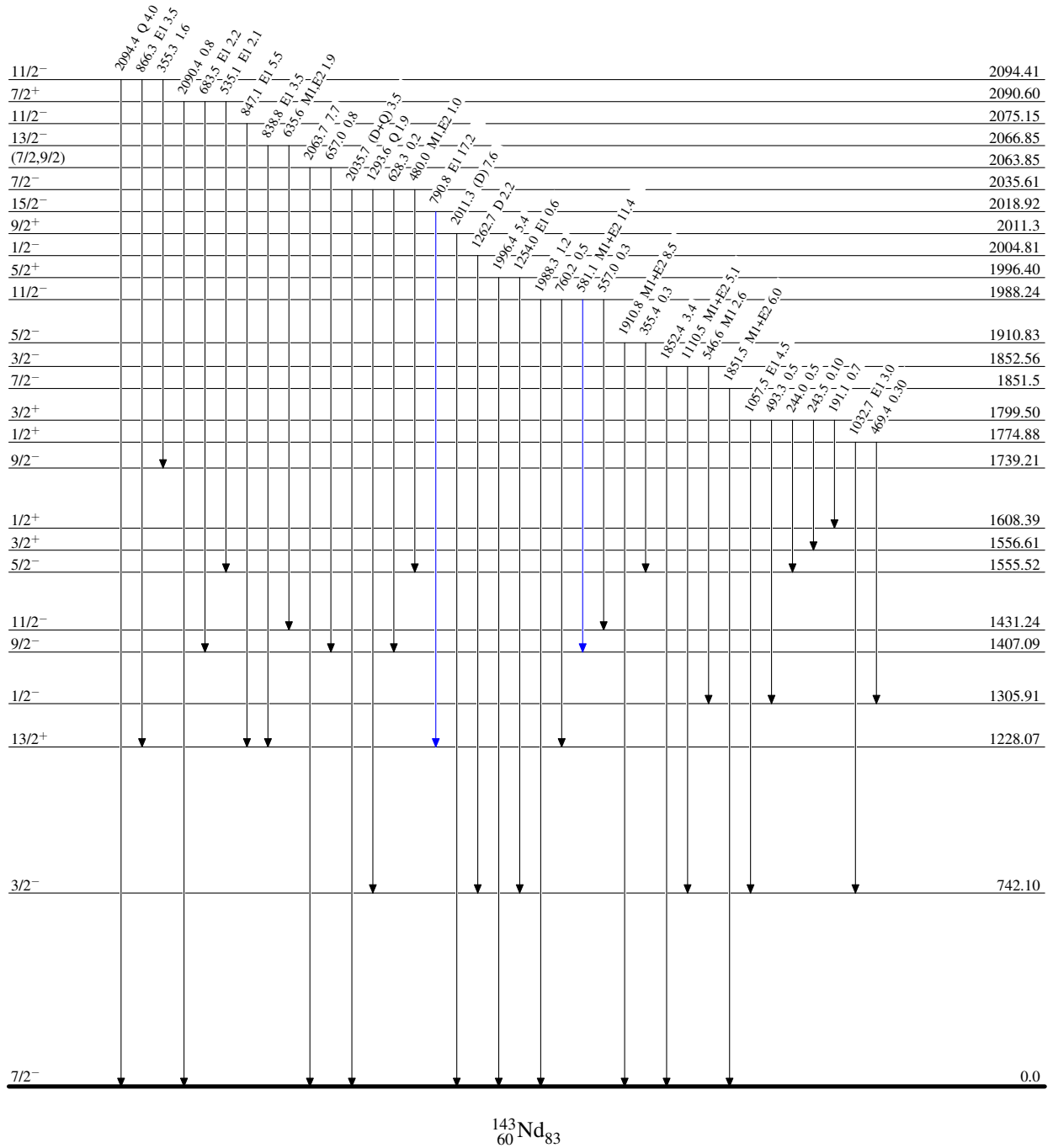
$^{140}\text{Ce}(\alpha, n\gamma)$ 1990Wr01

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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

 $^{143}_{60}\text{Nd}_{83}$

$^{140}\text{Ce}(\alpha, n\gamma)$ 1990Wr01

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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

