^{146}Nd(p,nγ) 1992Ue01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. Rodionov and G. Shulyak	NDS 136, 163 (2016)	14-Jul-2016

1992Ue01: ^{146}Nd(p,nγ), E=3.5-8 MeV; measured Eγ, Iγ, ce, nγ-, (ce)γ-coin, σ(Eγ,E(p)). ^{146}Pm; deduced levels, α(K)exp. Tandem, HPGe and neutron detectors, mini-orange spectrometer, enriched target.

The ^{146}Pm level scheme was constructed on the basis of in-beam studies of $\gamma\gamma$-coincidences and Eγ's relations. J^{π}'s were not defined by the authors. It was determined that 83.2 keV level has rather long lifetime (in the μs-range).

^{146}Pm Levels

E(level)†	J$^{\pi}$	Comments
0.0	3$^-$	J$^{\pi}$: from Adopted Levels.
17.23 *8*		
33.27 *7*		
73.13 *7*		
83.18 *7*		
89.09 *7*		
94.28 *8*		
136.42 *6*		
149.86 *6*		
166.93 *6*		
187.82 *7*		
201.10 *6*		
212.42 *5*		
235.53 *10*		
285.20 *7*		
292.64 *11*		
302.46 *6*		
310.58 *6*		
391.97 *6*		
417.91 *8*		
452.60 *9*		
518.33 *14*		
532.17 *7*		
564.42 *12*		
581.64 *11*		
589.50 *11*		
649.03 *8*		
665.82‡ *12*		
675.53 *8*		
699.52‡ *12*		
703.48 *12*		
758.50 *8*		
765.28 *7*		
791.50 *9*		
810.82‡ *12*		
833.59 *9*		
873.72 *12*		
920.82‡ *12*		
1028.28‡ *12*		

† From a least-squares fit to Eγ's; normalized χ^2=0.3.

‡ The state is somewhat uncertain because is based on a single decay line.

^{146}Nd(p,nγ) 1992Ue01 (continued)

γ(^{146}Pm)

Eγ[†]	Iγ[‡]	Ei(level)	Ef	J^π_f	Mult.[#]	α[&]	Comments
61.0 1	204 7	94.28	33.27				
62.6 1	46 2	212.42	149.86				
73.1 1	391 13	73.13	0.0	3⁻			
[x]74.3 1	108 4						
[x]74.9 1	98 3						
76.0 1	120 4	212.42	136.42				
83.2 1	104 3	83.18	0.0	3⁻			
89.1 1	395 13	89.09	0.0	3⁻			
93.8 1	191 6	166.93	73.13				
97.4 1	6 1	285.20	187.82				
98.7 1	69 2	187.82	89.09				
104.7 1	89 3	187.82	83.18				
106.8 1	76 3	201.10	94.28				
[x]108.2 1	186 6						
[x]128.0 1	42 2						
132.6 1	175 6	149.86	17.23		(M1)[@]	0.694	α(K)exp=0.82 13 α(K)=0.590 9; α(L)=0.0825 12; α(M)=0.01762 25 α(N)=0.00397 6; α(O)=0.000599 9; α(P)=3.79×10^{-5} 6
135.6 1	56 3	302.46	166.93				
136.4 1	1000 32	136.42	0.0	3⁻	M1,E2	0.70 6	α(K)exp=0.54 9 α(K)=0.51 4; α(L)=0.14 7; α(M)=0.032 16 α(N)=0.007 4; α(O)=0.0010 4; α(P)=2.9×10^{-5} 7
[x]137.9 1	60 3						
142.8 1	136 5	292.64	149.86		M1,E2	0.60 4	α(K)exp=0.50 9 α(K)=0.45 3; α(L)=0.12 6; α(M)=0.027 13 α(N)=0.006 3; α(O)=0.0008 4; α(P)=2.5×10^{-5} 6
149.9 1	702 23	149.86	0.0	3⁻	M1,E2	0.52 3	α(K)exp=0.41 7 α(K)=0.39 3; α(L)=0.10 4; α(M)=0.022 10 α(N)=0.0049 21; α(O)=0.00067 25; α(P)=2.2×10^{-5} 5
162.4 1	187 6	235.53	73.13		M1,E2	0.402 10	α(K)exp=0.28 5 α(K)=0.31 3; α(L)=0.07 3; α(M)=0.016 7 α(N)=0.0036 14; α(O)=0.00050 16; α(P)=1.7×10^{-5} 4
166.0 1	19 1	302.46	136.42				
167.8 1	77 3	201.10	33.27				
179.5 1	98 3	391.97	212.42				
187.8 1	193 6	187.82	0.0	3⁻			
190.8 1	14 1	391.97	201.10				
[x]192.2 1	73 2						
195.2 1	49 2	212.42	17.23				
196.1 1	60 2	285.20	89.09				
[x]198.9 1	100 3						
201.1 1	206 7	201.10	0.0	3⁻			
212.4 1	266 9	212.42	0.0	3⁻	M1	0.188	α(K)exp=0.20 3 α(K)=0.1598 23; α(L)=0.0221 4; α(M)=0.00472 7 α(N)=0.001065 15; α(O)=0.0001609 23; α(P)=1.023×10^{-5} 15
216.3 1	226 7	310.58	94.28		M1	0.179	α(K)exp=0.20 4 α(K)=0.1521 22; α(L)=0.0211 3; α(M)=0.00449 7 α(N)=0.001013 15; α(O)=0.0001531 22; α(P)=9.73×10^{-6} 14
[x]220.3 1	29 1						
225.1 1	13 1	391.97	166.93				
233.2 1	20 1	765.28	532.17				
[x]245.0 1	63 2						
250.9 1	106 4	417.91	166.93				
251.5 1	136 5	452.60	201.10				

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^{146}Nd(p,nγ) 1992Ue01 (continued)

γ(^{146}Pm) (continued)

Eγ†	Iγ‡	Ei(level)	Ef	$J^π_f$	Mult.#	α&	Comments
263.0 *1*	49 *2*	1028.28	765.28				
x264.3 *1*	7 *1*						
277.3 *1*	178 *6*	310.58	33.27		M1	0.0916	α(K)exp=0.076 *13* α(K)=0.0780 *11*; α(L)=0.01073 *15*; α(M)=0.00229 *4* α(N)=0.000516 *8*; α(O)=7.79×10^{-5} *11*; α(P)=4.97×10^{-6} *7*
278.9 *2*	9 *1*	589.50	310.58				
281.5 *1*	46 *2*	417.91	136.42		M1	0.0880	α(K)exp=0.098 *10* α(K)=0.0750 *11*; α(L)=0.01030 *15*; α(M)=0.00220 *3* α(N)=0.000495 *7*; α(O)=7.49×10^{-5} *11*; α(P)=4.78×10^{-6} *7*
282.8 *1*	57 *2*	518.33	235.53				
283.5 *1*	26 *2*	675.53	391.97				
285.2 *1*	139 *5*	285.20	0.0	3$^-$	M1	0.0850	α(K)exp=0.072 *11* α(K)=0.0724 *11*; α(L)=0.00995 *14*; α(M)=0.00212 *3* α(N)=0.000478 *7*; α(O)=7.23×10^{-5} *11*; α(P)=4.61×10^{-6} *7*
289.1 *2*	16 *2*	581.64	292.64				
302.4 *1*	163 *5*	302.46	0.0	3$^-$	M1,E2	0.063 *10*	α(K)exp=0.052 *10* α(K)=0.052 *11*; α(L)=0.00869 *22*; α(M)=0.00189 *8* α(N)=0.000421 *14*; α(O)=6.11×10^{-5} *12*; α(P)=3.1×10^{-6} *9*
310.6 *1*	14 *1*	310.58	0.0	3$^-$			
318.8 *1*	81 *3*	391.97	73.13		M1	0.0633	α(K)exp=0.063 *15* α(K)=0.0540 *8*; α(L)=0.00739 *11*; α(M)=0.001574 *22* α(N)=0.000355 *5*; α(O)=5.37×10^{-5} *8*; α(P)=3.43×10^{-6} *5*
319.8 *1*	104 *4*	532.17	212.42				
358.4 *2*	16 *2*	452.60	94.28				
365.0 *1*	30 *2*	675.53	310.58				
369.2 *1*	82 *3*	581.64	212.42				
374.8 *2*	10 *2*	391.97	17.23				
376.6 *1*	85 *3*	564.42	187.82				
x377.3 *1*	59 *3*						
384.7 *1*	107 *4*	417.91	33.27				
388.4 *1*	71 *3*	589.50	201.10				
392.0 *1*	75 *3*	391.97	0.0	3$^-$			
392.9 *1*	94 *4*	703.48	310.58				
419.3 *1*	31 *2*	452.60	33.27				
x425.9 *1*	42 *2*						
440.0 *1*	66 *3*	675.53	235.53				
x444.1 *1*	48 *3*						
453.4 *1*	147 *5*	665.82	212.42				
461.2 *1*	28 *2*	649.03	187.82				
462.8 *1*	38 *2*	765.28	302.46				
480.9 *1*	37 *3*	791.50	310.58				
x495.2 *1*	53 *3*						
523.0 *1*	59 *3*	833.59	310.58				
532.2 *1*	122 *5*	532.17	0.0	3$^-$			
552.9 *1*	88 *4*	765.28	212.42				
557.4 *1*	30 *3*	758.50	201.10				
560.0 *1*	36 *3*	649.03	89.09				
563.1 *1*	166 *6*	699.52	136.42				
x564.7 *1*	64 *4*						
565.8 *1*	34 *3*	649.03	83.18				
x590.0 *1*	52 *4*						
591.5 *1*	45 *4*	758.50	166.93				
x598.2 *3*	52 *4*						
608.7 *1*	76 *4*	758.50	149.86				
615.3 *1*	89 *5*	765.28	149.86				
632.5 *1*	11 *3*	833.59	201.10				

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^{146}Nd(p,nγ) 1992Ue01 (continued)

γ(^{146}Pm) (continued)

Eγ[†]	Iγ[‡]	E_i(level)	E_f
655.1 *1*	34 *4*	791.50	136.42
[x]660.7 *1*	40 *4*		
674.4 *1*	91 *5*	810.82	136.42
[x]731.0 *1*	39 *4*		
737.3 *1*	68 *4*	873.72	136.42
[x]769.8 *1*	64 *5*		
784.4 *1*	70 *5*	920.82	136.42
[x]807.5 *2*	40 *5*		
[x]816.2 *1*	48 *5*		
[x]826.2 *1*	45 *5*		
[x]837.1 *1*	44 *5*		
[x]841.2 *1*	31 *5*		
[x]880.9 *1*	61 *5*		
[x]891.2 *1*	67 *5*		
[x]897.9 *1*	67 *5*		
[x]910.8 *1*	29 *5*		
[x]912.5 *1*	32 *5*		
[x]925.6 *1*	36 *5*		
[x]937.8 *2*	34 *5*		
[x]942.1 *1*	30 *5*		
[x]955.5 *1*	63 *5*		
[x]988.4 *1*	42 *5*		
[x]992.5 *1*	34 *5*		
[x]1003.8 *1*	55 *6*		
[x]1016.3 *1*	168 *9*		
[x]1035.6 *2*	27 *3*		
[x]1095.4 *2*	32 *3*		

† From 1992Ue01.
‡ From 1992Ue01 at E(p)=8 MeV, normalized to Iγ(136.4)=1000, authors also give values for E(p)=6 and 7 MeV.
# From α(K)exp (the values are taken from fig. 6 of 1992Ue01 by evaluators).
@ α(K)exp is larger than the theory values for both M1 and E2.
& Additional information 1.
x γ ray not placed in level scheme.

^{146}Nd(p,nγ) 1992Ue01

Level Scheme

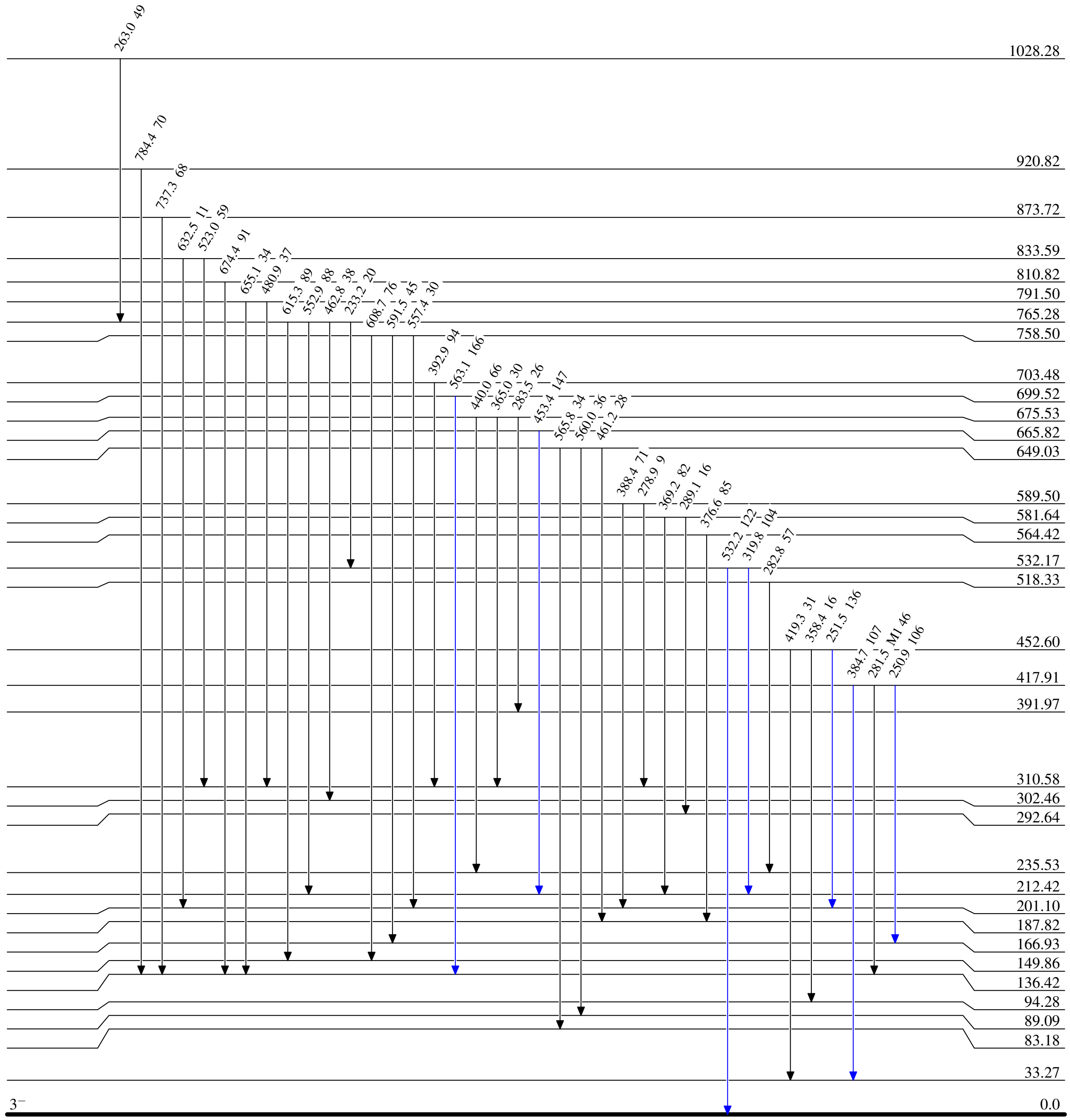
Intensities: Relative I_γ

Legend

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

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

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



$^{146}_{61}Pm_{85}$

^{146}Nd(p,nγ) 1992Ue01

Level Scheme (continued)

Intensities: Relative I_γ