^{148}Pr β^- decay (2.01 min) 1979Ik06,1986Wa06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Parent: ^{148}Pr: E=76.8 *2*; $J^\pi=4^-$; $T_{1/2}$=2.01 min *7*; Q(β^-)=4872 *15*; %β^- decay=64 *10*

Measured: γ, $\gamma\gamma$ (1979Ik06,1986Wa06,1984Ch30,1976Ya06); %β^- of the parent (2004Ko05,2008KoZO).

1997Gr09,1996Gr20: total absorption γ-ray spectrometer (TAGS) system used to measure β^- decay intensities, and the g.s. β^- feeding when operated in the $4\pi\gamma$-β coin mode.

Level scheme is that of 1979Ik06 with some modifications indicated by 1986Wa06 and 1982DeYW. TAGS data with a number of pseudolevels with≈69% β^- feeding to them indicates that the level scheme is not complete and has large uncertainties associated with it.

^{148}Nd Levels

E(level)[†]	J^π[‡]	Comments
0.0	0^+	
301.702 *16*	2^+	
752.4 *3*	4^+	
999.23 *12*	3^-	
1242.1 *4*	5^-	E(level): not observed by 1979Ik06; supported by 1986Wa06 data.
1279	6^+	Additional information 1.
1687.4 *7*	$(3,4,5)^+$	
1858.5 *4*	$(2^+,3)$	

[†] From a least-squares fit to Eγ data (level 1279 was held fixed).

[‡] Adopted values.

β^- radiations

β^-feeding was determined assuming no ground-state β decay.

E(decay)	E(level)	Iβ^-[†‡#]	Log *ft*	Comments
(3090 *15*)	1858.5	9.0 *9*	6.69 *9*	av Eβ=1264.6 *69*
(3261 *15*)	1687.4	1.6 *2*	7.53 *9*	av Eβ=1343.4 *70*
(3950 *15*)	999.23	42 *5*	6.47 *9*	av Eβ=1661.8 *70*
(4196 *15*)	752.4	43 *5*	6.57 *9*	av Eβ=1776.5 *70*

[†] From I(γ+ce) balance at each level.

[‡] TAGS analysis gives the following pseudolevels and associated Iβ (in %) in addition to the discrete levels listed. 1600 keV 0.9; 1950 keV 1.6; 2050 keV 2.7; 2150 keV 2.1; 2250 keV 2.1; 2400 keV 20.3; 2500 keV 5.2; 2600 keV 1.2; 2700 keV 1.7; 2800 keV 3.5; 2900 keV 3.6; 3000 keV 1.3; 3100 keV 1.0; 3200 keV 1.9; 3300 keV 1.9; 3400 keV 1.6; 3500 keV 0.6; 3600 keV 0.6; 3700 keV 1.0; 3800 keV 1.3; 3900 keV 3.0; 4000 keV 3.0; 4100 keV 3.0; 4200 keV 0.6; 4300 keV 1.3; 4400 keV 0.6; 4500 keV 0.3; 4600 keV 0.16. A simultaneous analysis of the spectra of both ^{148}Ce and ^{148}Pr 2.0 min decay was done, and the authors feel that in the energy range from≈750 keV to≈1300 keV, there is some ambiguity in the final results because of overlapping peaks. TAGS analysis indicates that transitions to the pseudolevels above 1859 keV account for≈68% of β^- intensity in this decay. Since the resolution of the TAGS system is typically 50-100 keV, the intensity assigned to a pseudolevel may represent β^- feeding to a single level or a group of levels. The same limitation applies to the intensity assigned to a known level, since it could include feeding to known or unknown levels in the resolution energy range.

[#] For absolute intensity per 100 decays, multiply by 0.64 *10*.

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$\gamma(^{148}Nd)$

Iγ normalization: Σ Ti(g.s.)=100 (assuming no β^- to 0^+ g.s. from parent). The uncertainty in Iγ normalization does not include that due to an incomplete decay scheme as indicated by≈69% β^- feeding to the pseudolevels observed in the TAGS measurements.
For some gammas part of the observed Iγ may belong to 2.27-min ^{148}Pr β^- decay.
For possible additional γ's see ^{148}Pr β^- decay (2.29 min).

E_γ ‡	I_γ #@	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α †	Comments
247.0 *10*	3.6 *5*	999.23	3^-	752.4	4^+				
301.702 *16*	190 *15*	301.702	2^+	0.0	0^+	E2		0.0515	α(K)=0.0408 *6*; α(L)=0.00840 *12*; α(M)=0.00184 *3*; α(N+..)=0.000463 *7* α(N)=0.000404 *6*; α(O)=5.69×10^{-5} *8*; α(P)=2.24×10^{-6} *4* Eγ: from 1979Bo26.
450.8 *3*	100 *7*	752.4	4^+	301.702	2^+	E2		0.01564	α(K)=0.01286 *19*; α(L)=0.00219 *3*; α(M)=0.000472 *7*; α(N+..)=0.0001204 *17* α(N)=0.0001045 *15*; α(O)=1.515×10^{-5} *22*; α(P)=7.46×10^{-7} *11*
489.7 *3*		1242.1	5^-	752.4	4^+	E1(+M2)	+0.03 *2*	0.00418 *11*	α=0.00418 *11*; α(K)=0.00359 *10*; α(L)=0.000469 *14*; α(M)=9.9×10^{-5} *3*; α(N+..)=2.55×10^{-5} *8* α(N)=2.20×10^{-5} *7*; α(O)=3.32×10^{-6} *10*; α(P)=2.09×10^{-7} *7* Eγ: from 1979Ta17; placement supported by the data of 1986Wa06 and 1982DeYW.
527		1279	6^+	752.4	4^+	E2		0.01023	α(K)=0.00850 *12*; α(L)=0.001365 *20*; α(M)=0.000293 *5*; α(N+..)=7.51×10^{-5} *11* α(N)=6.51×10^{-5} *10*; α(O)=9.52×10^{-6} *14*; α(P)=5.00×10^{-7} *7* Eγ: from 1986Wa06; 1979Ik06 observe a level at 1275.0 keV depopulated by 522.
697.52 *12*	80 *7*	999.23	3^-	301.702	2^+	E1		0.00191 *3*	α=0.00191 *3*; α(K)=0.001640 *23*; α(L)=0.000210 *3*; α(M)=4.42×10^{-5} *7*; α(N+..)=1.147×10^{-5} *16* α(N)=9.88×10^{-6} *14*; α(O)=1.495×10^{-6} *21*; α(P)=9.63×10^{-8} *14*
935.0 *6*	3.2 *2*	1687.4	$(3,4,5)^+$	752.4	4^+	M1+E2		0.0033 *7*	α=0.0033 *7*; α(K)=0.0028 *6*; α(L)=0.00038 *7*; α(M)=7.9×10^{-5} *15*; α(N+..)=2.1×10^{-5} *4* α(N)=1.8×10^{-5} *4*;

Continued on next page (footnotes at end of table)

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$\gamma(^{148}Nd)$ (continued)

E_γ [‡]	I_γ [#@]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						α(O)=2.7×10^{-6} *6*; α(P)=1.7×10^{-7} *4* δ: −0.53 *+8−10* or +3.0 *5*.
1106.2 *5*	8.2 *7*	1858.5	(2$^+$,3)	752.4	4$^+$	
1556.7 *4*	9.8 *8*	1858.5	(2$^+$,3)	301.702	2$^+$	

† Additional information 2.
‡ From 1979Ik06, unless indicated otherwise.
# Relative intensity (1979Ik06).
@ For absolute intensity per 100 decays, multiply by 0.32 *6*.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays