^{152}Nd β^- decay 1993Sh23

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 114, 1497 (2013)	31-Aug-2013

Parent: ^{152}Nd: E=0.0; J$^\pi$=0$^+$; $T_{1/2}$=11.4 min *2*; Q(β^-)=1105 *19*; %β^- decay=100.0

^{152}Pm Levels

1993Sh23: ^{235}U(n,F), ms; measured γ, ce, $\gamma\gamma$.
1990Sh24: ^{235}U(n,F), ion chem; measured γ, $\gamma\gamma$, $\beta\gamma$(t), $T_{1/2}$.
1971Da19: measured γ, $\gamma\gamma$.
Other: 1969Wa25.

E(level)†	J$^\pi$‡	$T_{1/2}$#	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0	1$^+$		220.96 *18*		570.78 *10*	1$^+$
16.03 *4*	0$^-$,1$^-$,2$^-$	2.1 ns *10*	294.55 *4*	1$^+$	592.40 *10*	1$^+$
25.02 *7*	(0$^+$,1$^+$,2$^+$)	≤1.0 ns	319.17 *14*		659.90 *12*	1$^+$
44.45 *4*	0$^-$,1$^-$,2$^-$		330.47 *14*			
200.48 *10*			450.80 *25*	0,1		

† From least squares fit to Eγ.
‡ From Adopted Levels.
# From 1990Sh24.

β^- radiations

E(decay)	E(level)	Iβ^-†#	Log *ft*	Comments
(445 *19*)	659.90	0.46 *7*	5.61 *10*	av Eβ=133 *7*
(513 *19*)	592.40	1.65 *22*	5.26 *8*	av Eβ=156 *7*
(534 *19*)	570.78	1.44 *19*	5.38 *8*	av Eβ=164 *7*
(654 *19*)	450.80	0.11 *2*	6.80 *9*	av Eβ=207 *7*
(810 *19*)	294.55	47 *6*	4.49 *7*	av Eβ=266 *8*
(884 *19*)	220.96	0.034 *9*	7.77 *12*	av Eβ=295 *8*
(905 *19*)	200.48	<0.1	>7.3	av Eβ=303 *8*
(1061 *19*)	44.45	<3.8	>6.0	av Eβ=365 *8*
(1080 *19*)	25.02	≤52‡	≥4.9	av Eβ=373 *8*
(1089 *19*)	16.03	<2	>6.3	av Eβ=376.5 *78*
(1105 *19*)	0.0	≤52‡	≥4.9	av Eβ=384 *8*

† From the intensity imbalance at each level.
‡ Iβ=46% 6 for the sum of the branches to the g.s. and the 25 level. See the comment on mult(25γ).
# Absolute intensity per 100 decays.

γ(^{152}Pm)

Iγ normalization: From a comparison of Iγ(278γ) with Iγ(116.8γ) in ^{151}Nd β^- decay 1993Sh23 obtained Iγ normalization=0.29 *3* using Iγ(116.8γ)=43.4% 24 (1988Si15). The evaluator adopts Iγ normalization=0.26 *3* based on Iγ(116.8γ)=39.0% 24 (2009Si01).

The α(K)exp were obtained by normalizing the ce and γ spectra to give α(K)exp(121.8γ, E2)=0.657 (1993Sh23). The 121.8γ is a 2$^+$ to 0$^+$ transition in the decay of ^{152}Pm. α(K)exp have been corrected by evaluator to give α(K)(121.8γ)=0.678.

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	δ	α[a]	Comments
16.09 *5*	16.7 *13*	16.03	0$^-$,1$^-$,2$^-$	0.0	1$^+$	E1		7.05 *12*	Mult.: α<24 from Iγ and the requirement that I(γ+ce)<100.
19.5 *1*	0.61 *5*	44.45	0$^-$,1$^-$,2$^-$	25.02	(0$^+$,1$^+$,2$^+$)	[E1]		4.14 *9*	
25.1 *1*	0.38 *3*	25.02	(0$^+$,1$^+$,2$^+$)	0.0	1$^+$	E2+M1[@]			
28.50 *10*	3.2 *3*	44.45	0$^-$,1$^-$,2$^-$	16.03	0$^-$,1$^-$,2$^-$	M1+(E2)[#]	<0.09	11 *2*	
44.44 *5*	21.3 *23*	44.45	0$^-$,1$^-$,2$^-$	0.0	1$^+$	[E1]		0.411	
94.1 *2*	0.209 *25*	294.55	1$^+$	200.48		[E1,M1,E2]		1.6 *13*	
156.0 *2*	0.335 *25*	200.48		44.45	0$^-$,1$^-$,2$^-$	[E1,M1,E2]		0.26 *18*	
176.6 *2*	0.145 *8*	220.96		44.45	0$^-$,1$^-$,2$^-$	[E1,M1,E2]		0.18 *12*	
184.5 *2*	0.41 *4*	200.48		16.03	0$^-$,1$^-$,2$^-$	[E1,M1,E2]		0.16 *11*	
200.5 *2*	0.103 *15*	200.48		0.0	1$^+$	[E1,M1,E2]		0.13 *9*	
240.5 *2*	0.32 *4*	570.78	1$^+$	330.47		[E1,M1,E2]		0.08 *5*	
250.15 *5*	63 *3*	294.55	1$^+$	44.45	0$^-$,1$^-$,2$^-$	E1		0.0226	Mult.: α(K)exp=0.016 *3* (1993Sh23).
250.3 *3*	0.33[‡] *5*	450.80	0,1	200.48		[E1,M1,E2]		0.07 *5*	
261.4 *3*	0.102[‡] *23*	592.40	1$^+$	330.47		[E1,M1,E2]		0.06 *4*	
269.4 *2*	0.95 *12*	294.55	1$^+$	25.02	(0$^+$,1$^+$,2$^+$)	[E1,M1,E2]		0.06 *4*	
273.2 *3*	0.20[‡] *7*	592.40	1$^+$	319.17		[E1,M1,E2]		0.06 *4*	
276.1 *2*	0.24[‡] *5*	570.78	1$^+$	294.55	1$^+$	[M1,E2]		0.082 *12*	
278.56 *5*	100 *6*	294.55	1$^+$	16.03	0$^-$,1$^-$,2$^-$	E1		0.0171	Mult.: α(K)exp=0.013 *3* (1993Sh23).
294.47 *5*	11.3 *6*	294.55	1$^+$	0.0	1$^+$	M1(+E2)	<1.5	0.071 *7*	Mult.: α(K)exp=0.066 *14* (1993Sh23).
302.9 *2*	0.36 *5*	319.17		16.03	0$^-$,1$^-$,2$^-$	[E1,M1,E2]		0.04 *3*	
314.4 *2*	0.31 *5*	330.47		16.03	0$^-$,1$^-$,2$^-$	[E1,M1,E2]		0.04 *3*	
340.5 *2*	0.36[‡] *8*	659.90	1$^+$	319.17		[E1,M1,E2]		0.032 *22*	
350.0 *3*	0.04 *2*	570.78	1$^+$	220.96		[E1,M1,E2]		0.030 *20*	
365.4 *2*	0.16[‡] *3*	659.90	1$^+$	294.55	1$^+$	[M1,E2]		0.037 *8*	
392.0 *3*	0.08 *2*	592.40	1$^+$	200.48		[E1,M1,E2]		0.022 *15*	
406.4 *4*	0.08 *3*	450.80	0,1	44.45	0$^-$,1$^-$,2$^-$	[E1,M1,E2]		0.020 *14*	
526.3 *3*	0.28 *5*	570.78	1$^+$	44.45	0$^-$,1$^-$,2$^-$	[E1]			
545.7 *2*	3.2 *3*	570.78	1$^+$	25.02	(0$^+$,1$^+$,2$^+$)	[M1,E2]		0.013 *3*	
547.7 *2*	0.42 *3*	592.40	1$^+$	44.45	0$^-$,1$^-$,2$^-$	[E1]		0.00336	
567.5 *3*	0.35 *6*	592.40	1$^+$	25.02	(0$^+$,1$^+$,2$^+$)	[M1,E2]		0.012 *3*	
570.7 *2*	1.36 *16*	570.78	1$^+$	0.0	1$^+$	[M1,E2]		0.011 *3*	
576.7 *2*	1.31 *16*	592.40	1$^+$	16.03	0$^-$,1$^-$,2$^-$	[E1]		0.00300	

$^{152}_{61}$Pm$_{91}$-2

γ(^{152}Pm) (continued)

E_γ[†]	I_γ[†&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α[a]
592.5 *2*	3.8 *3*	592.40	1^+	0.0	1^+	[M1,E2]	0.010 *3*
635.0 *2*	0.73 *9*	659.90	1^+	25.02	$(0^+,1^+,2^+)$	[M1,E2]	0.0088 *22*
660.0 *3*	0.48 *6*	659.90	1^+	0.0	1^+	[M1,E2]	0.0080 *20*

† From 1993Sh23.

‡ Determined from coincidence data (1993Sh23).

\# From the requirement of an intensity balance at the 44 and 16 levels, and the assumption that log ft>5.9 for the 0^+ to 1^- β^- branches to these levels, one gets $\alpha(28.5\gamma)$=10 *3*. Since α(theory)= 9.26 for mult=M1, one can adopt $\alpha(28.5\gamma)$=11 *2*. The upper limit allows an E2 admixture of δ<0.09.

@ Iβ(g.s. + 25 level)=46% 6 from Σ Iβ=54 *6* for the branches to the other levels. From the requirement of an intensity balance at the g.s. and 25 level, one gets $\alpha(25\gamma)$=486 *90* if all the feeding is to the 25 level, and α=21 *2* if the feeding is all to the g.s. with α(theory)=13.5 (M1) and 826 (E2) these α(exp) values give mult(25γ)=E2+M1 with 0.08<δ<1.5.

& For absolute intensity per 100 decays, multiply by 0.26 *3*.

^{a} 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.

$^{152}_{61}$Pm$_{91}$-3

^{152}Nd β^- decay 1993Sh23

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 decays through this branch