Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, E. Browne	NDS 109,2439 (2008)	31-Jul-2008

Q(β^-)=2191 *17*; S(n)=5066 *18*; S(p)=5545 *18*; Q(α)=4559 *23* 2012Wa38
Note: Current evaluation has used the following Q record 2188 15 *5069* 15 *5548* 15 *4*.54E3 20 2003Au03.
Additional information 1.

^{240}Np Levels

Cross Reference (XREF) Flags

A ^{240}U β^- decay (14.1 h)
B ^{240}Np IT decay (7.22 min)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	(5$^+$)	61.9 min *2*	AB	%β^-=100 J$^\pi$: probable configuration=π5/2[642]+ν5/2[622]; log *ft*=5.7 to (5$^-$). T$_{1/2}$: from 1982Pa23. Others: 60 min *2* (1951Or08), 63 min *2* (1960Le03), 67.0 min *10* (1966Qa01); see also recommendation of 1986LoZT. Value from 1982Pa23 is adopted here as it has been determined from a large dataset of 60 decay curves for seven strong γ rays whose time decay was followed up to 14 hours. Value from 1966Qa01 is the longest amongst all the other measurements. It should that the value of 7.50 min from 1966Qa01 for the isomer is also the longest amongst three other measurements. It is possible that there there is some systematic deviation in the half-life data of 1966Qa01.
0+x	(1$^+$)	7.22 min *2*	AB	%β^-=99.88 *1*; %IT=0.12 *1* (1981Hs02) E(level): x=20 *15* (1981Hs02,2003Au02); <18 keV from Q(β^-)(61.9 min)=2198 *30* and Q(β^-)(7.22 min)=2180 *20*. J$^\pi$: from strong β transition to 0$^+$ and 2$^+$ members of ground-state band and the 1$^-$ member of K^π=0$^-$ band in ^{240}Pu. Configuration=π7/2[633]+ν7/2[624] (1981Hs02). T$_{1/2}$: from 1981Hs02. Others: 7.3 min *3* (1948Hy61), 7.3 min *3* (1953Kn23), 7.50 min *6* (1966Qa01). See half-life comment for the g.s. concerning value of 7.50 min from 1966Qa01. %IT: fractional decay to the ground state was confirmed by observing growth and decay of 566.3γ, the strongest transition following decay of 61.9-min ^{240}Np (1981Hs02). 1986LoZT adopted %IT=0.11 *3* from an older Nuclear Data Sheets evaluation.
44.17+x *6*	(1$^+$)		A	J$^\pi$: M1(+E2) γ to (1$^+$); log *ft* $\approx$ 6.1 from 0$^+$.
61.4+x? *1*			A	
82.6+x? *1*			A	
110.7+x? *1*			A	
111.6+x? *2*			A	
189.7+x *1*	(0$^-$,1)†		A	
280.0+x? *1*	(0$^-$,1)†		A	
294.8+x? *3*	(0$^-$,1)†		A	
299.8+x *2*	(0$^-$,1)†		A	

† Possible β^- feeding (allowed or first-forbidden) from 0$^+$; log *ft* limit disfavors J$^\pi$=0$^+$.

Adopted Levels, Gammas (continued)

$\gamma(^{240}Np)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ	α[‡]	Comments
44.17+x	(1$^+$)	44.10 *7*	100	0+x	(1$^+$)	M1(+E2)	0.07 *7*	59 *10*	α(L)=44 *7*; α(M)=10.9 *20*; α(N+..)=3.8 *7* α(N)=3.0 *6*; α(O)=0.73 *13*; α(P)=0.139 *20*; α(Q)=0.01030 *18* Mult.: from ^{240}U β^- decay.
61.4+x?		(17.2)		44.17+x	(1$^+$)				
82.6+x?		82.6 *1*	100	0+x	(1$^+$)				
110.7+x?		49.1 *2*	4.5 *12*	61.4+x?					
		66.5 *1*	100 *10*	44.17+x	(1$^+$)				
111.6+x?		50.3 *2*	100	61.4+x?					
189.7+x	(0$^-$,1)	78.1 *2*	1.7 *4*	111.6+x?					
		128.3 *1*	36.5 *8*	61.4+x?					
		145.4 *1*	34.0 *8*	44.17+x	(1$^+$)				
		189.7 *1*	100 *4*	0+x	(1$^+$)				
280.0+x?	(0$^-$,1)	169.2 *1*	100 *7*	110.7+x?					
		280.1 *1*	13.9 *9*	0+x	(1$^+$)				
294.8+x?	(0$^-$,1)	212.3 *5*	78 *15*	82.6+x?					
		294.8 *3*	100 *21*	0+x	(1$^+$)				
299.8+x	(0$^-$,1)	255.6 *2*	30.8 *23*	44.17+x	(1$^+$)				
		299.8 *2*	100 *8*	0+x	(1$^+$)				

[†] From ^{240}U β^- decay.

[‡] 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.

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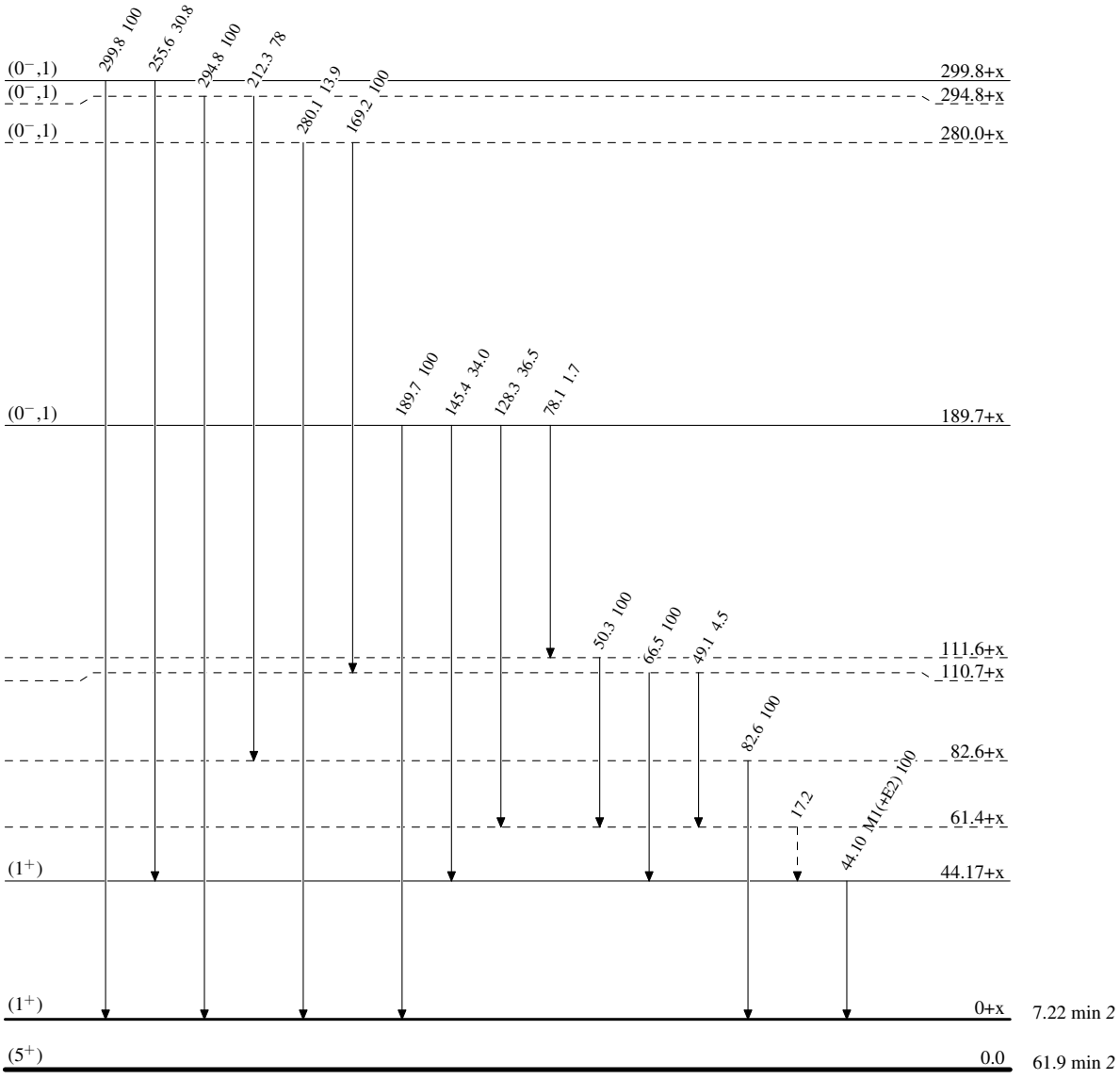
Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{240}_{93}Np_{147}$