^{237}Np(n,γ) E=resonance 1990Ho02,1979Io01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 127, 191 (2015)	1-Jun-2014

Additional information 1.
E(n)=0.489 eV, 1.33 eV, 5.3 eV (1979Io01).
E(n)=1.48 eV (1990Ho02,1979Io01).
J^π(1.48 eV resonance)=2$^+$, J^π(5.8 eV resonance)=3$^+$ (1973Mu14).
Others: 2012Ha16, 2012Pr13, 2011Ch57, 2011Gu21, 2011Iw04, 2011Ma59, 2011Mu13, 2010Pr07, 2010No02, 2010Co02, 2009Ha10, 2008Br06, 2008Es01, 2008Pa14, 2007Ko28, 2006Ad16, 2006Vl01, 2005Na45, 2005Re25, 2005Sh15, 2004Sh01, 2003Ka47, 2002Ko18, 2001Wa28.
2012GU07: Neutron beam at E=0.7-500 eV from neutron time-of-flight facility n_TOF at CERN. Target=49.1 mg NpO_2 (99.2% purity). Measured total absorption γ spectra, E(n), σ(E), transmission spectra using 4π BaF_2 Total Absorption Calorimeter (40 BaF_2 crystals). Deduced neutron resonances, levels, level spacing distribution, average capture cross sections, neutron widths.
S(n)(^{238}Np)=5488.32 keV *20* (2012Wa38).
J^π(^{237}Np g.s.)=5/2$^+$.

^{238}Np Levels

Γ_γ=40.9 meV *18* for all resonances.

E(level)[†e]	J$^\pi$[‡]	Γ_n (eV)	Comments
26.4[b]	3$^+$		
136.0[#]	3$^-$		
179.2[@&d]	4$^-$		
182.9[#@&d]	2$^-$		
215.5[#@&a]	3$^-$		
246.8[c] *16*			
250.4[#&d]	(2)$^-$		
258.9[&d]	4$^-$		
325.2[#]	1$^-$		
334.0[#]	1$^-$ to 3$^-$		
347.7[&]	1$^-$ to 3$^-$		
352.5[#]	(3)$^-$		
367.3[#]	(2)$^-$		
373.7[&ab]	(1)$^-$		
386.2[a] *5*			
442.2[a]	(4)$^-$		
457.5[&b]	1$^-$ to 3$^-$		
529.9[#a]	2$^-$,3$^-$		
567.0[#&a]	3$^-$		
601.4[&ab]	1$^-$ to 3$^-$		
623.6[a] *15*			E(level): E=619.5 *3* for this level in thermal capture.
648.4[#&a]	1$^-$ to 3$^-$		
674.5[#&a]	1$^-$ to 3$^-$		
692.3[#&]	1$^-$ to 3$^-$		
S(n)+0.00132 *1*	3	3.17×10^{-5} eV *12*	S(n)=5488.32 keV *20* (2012Wa38). E(n)=0.001321 eV *1*.
S(n)+0.00148 *1*	2	1.81×10^{-4} eV *7*	E(n)=0.001478 eV *1*.
S(n)+0.00197 *1*	3	1.40×10^{-5} eV *5*	E(n)=0.001969 eV *1*.

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^{237}Np(n,γ) E=resonance 1990Ho02,1979Io01 (continued)

^{238}Np Levels (continued)

E(level)[†e]	J^{π}[‡]	Γ_n (eV)	Comments
S(n)+0.00387 *1*	3	2.07×10^{-4} eV *8*	E(n)=0.003865 eV *2*.
S(n)+0.00426 *1*	2	3.23×10^{-5} eV *12*	E(n)=0.004264 eV *3*.
S(n)+0.00486 *1*	2	3.96×10^{-5} eV *15*	E(n)=0.004863 eV *3*.
S(n)+0.00578 *1*	3	5.24×10^{-4} eV *19*	E(n)=0.005777 eV *4*.
S(n)+0.00638 *1*	3	7.8×10^{-5} eV *3*	E(n)=0.006378 eV *4*.
S(n)+0.00668 *1*	2	1.36×10^{-5} eV *5*	E(n)=0.006677 eV *4*.
S(n)+0.00719 *1*	2	8.2×10^{-6} eV *3*	E(n)=0.007189 eV *5*.
S(n)+0.00742 *1*	3	1.19×10^{-4} eV *4*	E(n)=0.007423 eV *5*.
S(n)+0.00768 *1*	2	1.76×10^{-6} eV *12*	E(n)=0.007678 eV *7*.
S(n)+0.00831 *1*	3	8.8×10^{-5} eV *3*	E(n)=0.008307 eV *6*.
S(n)+0.00898 *1*	3	1.01×10^{-4} eV *4*	E(n)=0.008978 eV *6*.
S(n)+0.00930 *1*	2	5.85×10^{-4} eV *22*	E(n)=0.009299 eV *6*.
S(n)+0.01023 *1*	2	2.75×10^{-5} eV *10*	E(n)=0.010231 eV *7*.
S(n)+0.01068 *1*	3	4.22×10^{-4} eV *16*	E(n)=0.010682 eV *7*.
S(n)+0.01085 *1*	3	6.83×10^{-4} eV *25*	E(n)=0.010845 eV *8*.
S(n)+0.01110 *1*	2	1.00×10^{-3} eV *4*	E(n)=0.011097 eV *8*.
S(n)+0.01220 *1*	3	4.87×10^{-5} eV *18*	E(n)=0.012202 eV *9*.
S(n)+0.01262 *1*	2	8.9×10^{-4} eV *3*	E(n)=0.012618 eV *9*.
S(n)+0.01314 *1*	3	1.78×10^{-5} eV *7*	E(n)=0.013139 eV *9*.
S(n)+0.01428 *3*	2	9.6×10^{-7} eV *10*	
S(n)+0.01580 *1*	3	6.71×10^{-5} eV *25*	
S(n)+0.01595 *1*	3	3.74×10^{-5} eV *18*	
S(n)+0.01609 *1*	2	1.01×10^{-3} eV *4*	
S(n)+0.01686 *1*	2	2.90×10^{-4} eV *11*	
S(n)+0.01760 *1*	3	1.51×10^{-4} eV *6*	
S(n)+0.01791 *1*	2	1.55×10^{-5} eV *7*	
S(n)+0.01794 *4*	3	3.0×10^{-6} eV *3*	
S(n)+0.01889 *1*	2	4.18×10^{-5} eV *15*	
S(n)+0.01913 *1*	3	8.4×10^{-5} eV *3*	
S(n)+0.01993 *2*	3	6.22×10^{-5} eV *23*	
S(n)+0.02040 *2*	2	1.30×10^{-3} eV *5*	
S(n)+0.02110 *2*	3	4.29×10^{-4} eV *16*	
S(n)+0.02135 *2*	2	2.54×10^{-5} eV *11*	
S(n)+0.02202 *2*	2	1.46×10^{-3} eV *5*	
S(n)+0.02287 *2*	3	3.75×10^{-4} eV *14*	
S(n)+0.02368 *2*	3	1.39×10^{-3} eV *5*	
S(n)+0.02399 *2*	2	1.79×10^{-4} eV *7*	
S(n)+0.02476 *2*	3	5.03×10^{-5} eV *22*	
S(n)+0.02499 *2*	3	3.56×10^{-3} eV *13*	
S(n)+0.02620 *2*	3	2.11×10^{-4} eV *8*	
S(n)+0.02657 *2*	3	2.31×10^{-3} eV *9*	
S(n)+0.02709 *2*	2	4.33×10^{-5} eV *16*	
S(n)+0.02845 *2*	2	9.3×10^{-5} eV *3*	
S(n)+0.02862 *2*	3	3.59×10^{-5} eV *18*	
S(n)+0.02894 *2*	2	1.40×10^{-4} eV *5*	
S(n)+0.02948 *2*	2	8.5×10^{-5} eV *3*	
S(n)+0.03042 *2*	3	3.10×10^{-3} eV *11*	
S(n)+0.03076 *2*	2	3.44×10^{-4} eV *13*	
S(n)+0.03131 *3*	3	2.43×10^{-4} eV *9*	
S(n)+0.03167 *3*	3	4.52×10^{-5} eV *17*	
S(n)+0.03248 *3*	2	1.31×10^{-5} eV *9*	

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$^{237}Np(n,\gamma)$ E=resonance 1990Ho02,1979Io01 (continued)

^{238}Np Levels (continued)

E(level)[†e]	J^{π}[‡]	Γ_n (eV)	E(level)[†e]	J^{π}[‡]	Γ_n (eV)
S(n)+0.03343 *3*	3	3.87×10^{-4} eV *14*	S(n)+0.03820 *3*	3	1.10×10^{-3} eV *4*
S(n)+0.03391 *3*	2	4.37×10^{-4} eV *16*	S(n)+0.03892 *3*	3	7.3×10^{-4} eV *3*
S(n)+0.03406 *3*	3	3.8×10^{-5} eV *3*	S(n)+0.03901 *3*	2	4.1×10^{-4} eV *4*
S(n)+0.03469 *3*	3	1.45×10^{-4} eV *5*	S(n)+0.03924 *3*	3	5.14×10^{-4} eV *19*
S(n)+0.03521 *3*	2	3.67×10^{-4} eV *14*	S(n)+0.03984 *3*	2	9.1×10^{-5} eV *9*
S(n)+0.03639 *3*	3	1.12×10^{-4} eV *4*	S(n)+0.03994 *3*	3	4.18×10^{-4} eV *15*
S(n)+0.03685 *3*	2	8.4×10^{-5} eV *3*	S(n)+0.04137 *3*	3	1.82×10^{-3} eV *7*
S(n)+0.03716 *3*	3	1.07×10^{-3} eV *4*	S(n)+0.04241 *4*	3	5.90×10^{-5} eV *22*
S(n)+0.03790 *3*	2	4.0×10^{-5} eV *4*	S(n)+0.04284 *4*	3	7.3×10^{-5} eV *3*
S(n)+0.03807 *3*	2	2.33×10^{-4} eV *19*			

[†] Rounded-off values from Adopted Levels. The primary γ data are given in 1990Ho02 and 1979Io01, along with the level energies deduced from these transitions.

[‡] From Adopted Levels. Levels strongly fed from the 1.48-eV 2^+ resonance are expected to have J=1, 2, or 3, and those fed from the 3^+ 5.8-eV resonance are expected to have J=2, 3, or 4.

[#] Fed from the 1.48-eV resonance and reported by both 1979Io01 and 1990Ho02.

[@] Fed from the 5.8-eV resonance.

[&] Fed from the 1.33-eV resonance.

[a] Fed from the 0.489-eV resonance.

[b] Fed from the 1.48-eV resonance but reported only by 1990Ho02.

[c] Fed from the 1.48-eV resonance but reported only by 1979Io01.

[d] Primary transition from 0.489-eV resonance could feed one or both of the close-lying levels at this energy.

[e] Neutron resonance energies are from 2012Gu07.