^{58}Ni(d,n), (d,np) 1993InZZ,1976Vi06,1973Bo02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 151, 1 (2018)	1-Apr-2018

Others: 1966Ok01, 1967Ma18 (E=5 MeV), 1969Ok01.

1993InZZ: E=25 MeV; 99.9% ^{58}Ni target, θ(lab)=10°−60° (3° or 5° steps), FWHM≈200 keV. Measured E(n), $\sigma(\theta)$; DWBA analysis.

1973Bo02: E=7.0 MeV. Measured $\sigma(\theta)$, neutron time-of-flight, 99.9% ^{58}Ni target, θ≈10°−150°. DWBA analysis after subtraction of compound nuclear component estimated from Hauser-Feshbach calculations. Authors′ E(level) not given; observed states identified using E(level) from an earlier compilation.

1969Ok01, 1966Ok01: E=11.7 MeV. Measured $\sigma(\theta)$, neutron tof, FWHM≈150 keV.

1976Vi06: E=10 MeV. Measured n-p(θ) for θ(n)=25° and θ(p)=30°−330°, dσ/(dθ_ndθ_p) for θ(n)=16°−45° and θ(p)=105°−165°. DWBA analysis using resonance form factor.

^{59}Cu Levels

E(level)‡	Jπ#	L†	C^{2}S′†	Comments
0.0		1	1.85	C^{2}S′: 1.43 in 1993InZZ assuming 2p$_{3/2}$ orbital.
479 *10*		1	0.84	C^{2}S′: 0.63 in 1993InZZ.
895 *10*		3	2.5	C^{2}S′: 2.42 in 1993InZZ.
1375 *10*		3	0.28&	L,C^{2}S′: from 1993InZZ. C^{2}S′ assumes f$_{7/2}$ orbital. 1973Bo02 report C^{2}S′=0.4 *1*.
1837 *10*		3	0.06&	L,C^{2}S′: from 1993InZZ for E=1850 level; C^{2}S′ assumes f$_{7/2}$ orbital.
1962 *10*			&	
2239 *10*				
2299 *10*		1	0.20	C^{2}S′: 0.18 in 1993InZZ assuming 2p$_{3/2}$ orbital.
2369 *10*				
2564 *10*				
2693 *10*		3	0.06&	L,C^{2}S′: from 1993InZZ for E=2710 level, assuming f$_{7/2}$ orbital; L=(3), C^{2}S′≤0.3 in 1973Bo02.
2850?c		1+4c	c	E(level),L: from fig. 2 of 1993InZZ; absent from table 1. Almost certainly a ^{61}Cu level (see table 2 of 1993InZZ); level not included in Adopted Levels.
2913 *10*				
3023 *10*		4	2.4	C^{2}S′: 2.33 in 1993InZZ.
3114 *10*		1	0.22	C^{2}S′: 0.25 in 1993InZZ.
3298 *10*			&	
3427 *10*			&	
3579 *10*		2	0.60	C^{2}S′: 0.52 in 1993InZZ.
3654 *10*				
3736 *10*		1	0.11	
3893 *10*		1	0.51b	Possible analogue of ^{59}Ni(g.s.). 1993InZZ report E=3940 and C^{2}S′=0.84 (if 2p$_{3/2}$ orbital).
4000 *10*		1	0.30	
4049 *10*				
4106 *10*				
4265 *10*				
4308 *10*		3	1.76	Possible ^{59}Ni(339 level) analogue. L,C^{2}S′: from 1993InZZ for E=4320 level.
4358 *10*		1	0.35	Probable ^{59}Ni(465 level) analogue. E=4330 *50* in 1969Ok01. L,C^{2}S′: from 1969Ok01. C^{2}S′=0.11 in 1993InZZ.
4790@ *50*		1@	0.08@	E(level): possible ^{59}Ni(878 level) analogue (1969Ok01). For L=1 component of E=4810 doublet in 1993InZZ, C^{2}S′=0.11 assuming 2p$_{3/2}$ orbital.
4810c		4c	0.09c	E(level): for doublet. L and C^{2}S′ are for component of doublet.
5240 *30*	1/2−	1a	0.21	Possible ^{59}Ni(1302 level) analogue. E=5190 *50* in 1969Ok01; E=5270, C^{2}S′=0.13 in

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^{58}Ni(d,n), (d,np) 1993InZZ,1976Vi06,1973Bo02 (continued)

^{59}Cu Levels (continued)

E(level)‡	Jπ#	L†	C^{2}S′†	Comments
				1993InZZ.
				Γ_{p0}=66 eV *10* (1976Vi06). C^{2}S′ is from 1969Ok01.
5330 *30*				
5490 *30*				
5620 *30*	1/2$^-$	1[a]		Γ_{p0}=270 eV *70* (1976Vi06).
5630[c]		3[c]	0.17[c]	
5710 *30*				
5850 *30*	5/2$^+$	2[a]		Γ_{p0}=59 eV *9* (1976Vi06).
5900[c]		4[c]	0.39[c]	
5930 *30*				
6030 *30*				
6120 *30*	3/2$^+$,5/2$^+$	2[a]		Γ_{p0}=150 eV *30*, 83 eV *13* (1976Vi06).
6210 *30*	5/2$^-$,7/2$^-$	3[a]		
6240[c]		4[c]	0.65[c]	
6330 *30*	3/2$^+$,5/2$^+$	2[a]		E(level),Jπ: possible multiplet. Γ_{p0}=300 eV *60*, 170 eV *25* for multiplet (1976Vi06).
6410 *30*				
6540[c]		4[c]	0.35[c]	E(level): 1976Vi06 report a possible doublet at E=6520 *30*. Γ_{p0}=510 eV *140*, 370 eV *50* for doublet (1976Vi06).
6620 *30*				
6750 *30*				Γ_{p0}=850 eV *140*, 470 eV *90* (1976Vi06).
6850 *30*		2,3[a]		Γ_{p0}=220 eV *40* (1976Vi06).
6900[c]		4[c]	1.73[c]	
6940 *30*	5/2$^-$,7/2$^-$	3[a]		Γ_{p0}=490 eV *80*, 320 eV *50* (1976Vi06).
7120 *30*	3/2$^+$,5/2$^+$	2[a]	0.15	E(level),Jπ: possible doublet. C^{2}S′: from 1993InZZ for L=2 component of E=7180 doublet. Γ_{p0}=3.4 keV *5*, 1.9 keV *3* (1976Vi06) for doublet.
7200 *30*		4	0.23	L,C^{2}S′: from 1993InZZ, for component of E=7180 doublet. Γ_{p0}=1.9 keV *4*, 1.00 keV *15* (1976Vi06).
7290 *30*	3/2$^+$	2[a]		Γ_{p0}=1.9 keV *4* (1976Vi06).
7400 *30*	3/2$^+$	2[a]		Γ_{p0}=4.7 keV *7* (1976Vi06).
7450[c]		3+4[c]	0.16+0.33[c]	
7550 *30*				
7730[c]		4+2[c]	0.43+0.09[c]	E(level): 1976Vi06 report E=7680 *30*.
7810 *30*				
7920 *30*	3/2$^+$,5/2$^+$	2[a]	0.01	C^{2}S′: from 1993InZZ for L=2 component of 7940 doublet. Γ_{p0}=1.9 keV *3* (1976Vi06).
7940[c]		4[c]	0.32[c]	E(level): for doublet. L and C^{2}S′ are for component of doublet. Γ_{p0}=1.08 keV *15*, 6.4 keV *10* (1976Vi06).
8020 *30*				
8100 *30*				
8210 *30*	3/2$^+$,5/2$^+$	2[a]	0.21	C^{2}S′: from 1993InZZ for L=2 component of 8230 doublet. Γ_{p0}=13.0 keV *65*, 8 keV *4* (1976Vi06).
8230[c]		4[c]	0.50[c]	E(level): for doublet. L and C^{2}S′ are for component of doublet.
8270 *30*	3/2$^+$,5/2$^+$	2[a]		Γ_{p0}=13.0 keV *65*, 8 keV *4* (1976Vi06).
8390 *30*				
8630[c]		4[c]	0.42[c]	
9060[c]		4+2[c]	0.15+0.04[c]	
9280[c]		4+2[c]	0.32+0.07[c]	
9780[c]		4+2[c]	0.10+0.07[c]	
10130[c]		4+2[c]	0.10+0.08[c]	
10500[c]		4+2[c]	0.12+0.08[c]	

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^{58}Ni(d,n), (d,np) 1993InZZ,1976Vi06,1973Bo02 (continued)

^{59}Cu Levels (continued)

† L values and spectroscopic factors are from comparisons of $\sigma(\theta)$ with DWBA calculations, assuming $p_{1/2}$, $d_{5/2}$, $f_{5/2}$ and $g_{9/2}$ orbitals for L=1, 2, 3, 4 transfer, respectively. L and $C^2S'=(2J_f+1)C^2S$ data from 1973Bo02 are quoted, unless noted otherwise.

‡ For E<5200, data are from 1967Ma18; stated ΔE=10 keV, but data are consistently low by 10 to 30 keV for E<3500. For E≥5200, E is from 1976Vi06; stated ΔE=20-30 keV, except otherwise noted. Level not referenced in Adopted dataset if energy overlapped with three or more level energies.

From p-n angular correlation data of 1976Vi06; DWBA analysis.

@ Data from 1969Ok01. Note that C^2S' values from this source are, typically, larger than those from 1973Bo02 by factors of up to 2.1.

& 1973Bo02 report significant compound-nuclear contribution to $\sigma(\theta)$.

a From 1976Vi01.

b 1969Ok01 report $C^2S'=1.12$ for an L=1 transfer at E=3880 *50*.

c From 1993InZZ.