^{58}Ni(α,p) 2001Ny01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Kazimierz Zuber, Balraj Singh	NDS 125, 1 (2015)	25-Jan-2015

2001Ny01: Target of ^{58}Ni evaporated on to carbon foil of ≈40 μg/cm^2, was bombarded with 25-MeV α particles from the Niels Bohr Institute Tandem Accelerator. Measured angular distributions protons from the (α,p) reaction were momentum analyzed in multigap spectrometer and registered with photographic emulsions. Spectra were recorded at angles ranging from 7.5° to 77.5° in steps of 5°, and energy resolution is ≈25 keV. The emulsions were manually scanned in 1/2 mm strips. Spin and parity assignments made from comparison of the experimental angular distributions of the emerging protons with theoretical angular distributions calculated with the DWUCK-4 code using a cluster form factor.

1972Bu17: Eα=19.3 MeV. Semi, FWHM=150-200 keV. Enriched target. Measured $\sigma(\theta)$, θ(c.m.)=10°−130°. A total of eight groups are in the spectral figure 1, four of which (0, 470, 970 and 2700) were analyzed for $\sigma(\theta)$ data.

1971Ho21: Eα=12.5 MeV. Magnetic spectrograph, FWHM=12 keV. θ(lab)= 90° and 154°. Levels up to 3978 keV.

Others: 1965Le05, 1973Ma38.

^{61}Cu Levels

E(level)[†]	J$^\pi$[‡]	dσ/dΩ (μb/sr)[d]	E(level)[†]	J$^\pi$[‡]	dσ/dΩ (μb/sr)[d]
0[#]	3/2$^-$	512	3325 5	(3/2)	13
475[#] 2	1/2$^-$	197	3364[@] 6		
970[#] 2	5/2$^-$	189	3410 2	5/2$^+$	426
1310 5	7/2$^-$	45	3437[@] 6		
1393 5	5/2$^-$	32	3459[@] 6		
1658[@] 2			3528[@] 6		
1732[@] 3			3552[@] 6		
1919[@] 3			3578[@] 6		
1934[&] 2	3/2$^-$	58	3591 2	(5/2$^+$)	114
2088[@c] 3			3618[@] 6		
2203 2	5/2$^-$	56	3647 5	(5/2,7/2)	35
2294[@] 3			3660[@] 6		
2335 5	(5/2$^-$)	42	3686[@] 7		
2355 5	(3/2$^-$)	15	3705[b] 5	(11/2$^-$)	14
2400[@] 3			3748[@] 7		
2472[@] 3			3795[a] 5	(7/2,9/2)	19
2586[@] 4			3820[b] 5		18
2610[@] 4			3849 5	(7/2,5/2)	24
2626 5	(7/2$^-$,11/2$^-$)	37	3944 5	(9/2$^+$)	23
2684[@] 4			3983 2	(7/2$^-$,5/2)	88
2721[#&] 2	9/2$^+$	633	4008 2	(1/2)	72
2793[@] 4			4041 5	(7/2)	44
2843[@] 4			4085 2	(9/2)	81
2853 5	3/2$^-$	36	4134 5	(9/2)	15
2926[&] 5	(5/2,7/2$^-$)	10	4232 5	(11/2$^-$)	13
3005[@] 5			4260 5	(7/2)	33
3015[&] 2	(11/2$^-$,7/2$^-$)	84	4292 5	(11/2$^-$)	29
3066[@] 5			4337 2	(7/2,5/2$^+$)	159
3095[@] 5			4386 5	(9/2$^-$)	23
3203[@] 5			4423 5	(9/2$^-$,7/2)	17
3256 5	(7/2$^-$,11/2$^-$)	11	4463 5	(9/2$^-$,7/2)	20
3276[@] 5			4516 5	(7/2)	43

Continued on next page (footnotes at end of table)

^{58}Ni(α,p) 2001Ny01 (continued)

^{61}Cu Levels (continued)

E(level)[†]	Jπ[‡]	dσ/dΩ (μb/sr)[d]	E(level)[†]	Jπ[‡]	dσ/dΩ (μb/sr)[d]
4560 *5*	(5/2,7/2)	35	4879 *5*	(7/2)	36
4598 *2*	(7/2)	223	4910 *5*	(9/2,7/2)	21
4665 *5*	(7/2)	36	4943 *5*	(7/2)	32
4702 *5*	(7/2)	20	5015 *2*	(9/2)	149
4756 *5*	(7/2)	41	5063 *5*		29
4817 *5*	(9/2)	18	5101 *5*		48
4845 *5*	(9/2$^-$,7/2)	26	5153 *2*	(9/2$^-$,7/2)	170

[†] From 2001Ny01, except as noted. The uncertainties in 2001Ny01 are stated as ≈2 keV for strongest groups and ≈5 keV for the weakest groups. The evaluators assign these as follows: 2 keV for dσ/dΩ>50 μb/sr and 5 keV for weaker peaks.

[‡] From σ(θ) data and comparisons with DWBA calculations (2001Ny01).

[#] The σ(θ) distribution shown in 1972Bu17 but no conclusions about L-transfers have been drawn.

[@] From 1971Ho21, not reported in 2001Ny01.

[&] A doublet (from γ-ray data, see ^{58}Ni(α,pγ)).

[a] Probably the same as 3802 7 in 1971Ho21.

[b] E(level) not reported in 1971Ho21.

[c] Also reported in 1972Bu17. 2001Ny01 do not report this level, however, in their spectral figure 2, a weak peak near this energy is present.

[d] The absolute cross sections were obtained by measuring the (α,p)-yield relative to elastic scattering at forward angles and normalizing to optical model predictions, dσ/dΩ (μb/sr) measured at 12.5 ° angle with the uncertainties above 20%.