^{70}Zn(d,p) 1967Vo05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 188,1 (2023)	17-Jan-2023

1967Vo05: E=10 MeV deuteron beam from the Argonne Tandem Van de Graaff accelerator. Two detector systems were used: 1. refrigerated surface barrier Si detector with FWHM=50 keV and target of ≈0.5 mg/cm^2 thickness, angular distributions measured between 25° and 165°. 2. Broad-range magnetic spectrograph with FWHM=10-15 keV and target of 20 μg/cm^2 thickness evaporated on a carbon substrate, angular distributions measured from 7.5° to 170° (lab). DWBA analysis of angular distribution data.

Others: 1965Bo36, 1966Sa12.

1965Bo36 (also reanalysis in 1968Gr23). Seven groups were reported at 0 (L=1), 670 (L=1), 840, 1290, 1630 (L=0), 2340 (L=1) and 3750.

Differential cross sections in the angular range of 7.5° to 170° (lab system) for levels up to 3178 keV are listed in table XII of 1967Vo05.

^{71}Zn Levels

E(level)	J$^\pi$	L[†]	(2J+1)S[@]	Comments
0	(1/2)$^-$ [c]	1[#]	0.95	(2J+1)S: other: 0.67 (1967Vo05), 0.90 (1968Gr18). dσ/dΩ(max)=3.8 mb/sr (1967Vo05), dσ/dΩ=2.6 mb/sr (1968Gr18).
157 *5*		4	5.8	(2J+1)S: other: 3.6. dσ/dΩ(max)=0.8 mb/sr.
285 *5*		2	0.19	(2J+1)S: other: 0.14. dσ/dΩ(max)=0.45 mb/sr.
465[&] *5*		3	0.76	(2J+1)S: other: 0.62. dσ/dΩ(max)=0.3 mb/sr.
489[&] *5*		1	0.08	(2J+1)S: other: 0.06. dσ/dΩ(max)=0.34 mb/sr.
675 *5*	(3/2)$^-$ [c]	1[#]	0.23	E(level): 670, L=1 (1965Bo36). (2J+1)S: other: 0.16. dσ/dΩ(max)=1.0 mb/sr.
853 *5*		2	0.42	E(level): 840 (1965Bo36). (2J+1)S: other: 0.31. dσ/dΩ(max)=1.1 mb/sr.
1052[‡b] *10*				dσ/dΩ(max)≈0.2 mb/sr.
1078[‡] *10*				dσ/dΩ(max)≈0.15 mb/sr.
1260 *10*		2	0.08	E(level): 1290 (1965Bo36). (2J+1)S: other: 0.06. dσ/dΩ(max)=0.24 mb/sr.
1421 *10*	(3/2)$^-$ [c]	1	0.09	(2J+1)S: other: 0.06. dσ/dΩ(max)=0.43 mb/sr.
1629 *10*		0[#]	0.29	E(level): 1630 (1965Bo36). (2J+1)S: other: 0.27. dσ/dΩ(7.5°)=6.4 mb/sr.
1661 *10*		2	0.86	(2J+1)S: other: 0.65. dσ/dΩ(max)=2.8 mb/sr.
1742[‡] *10*				dσ/dΩ(max)≈0.9 mb/sr.
1793?[‡] *10*				dσ/dΩ(7.5°)≈0.12 mb/sr.
1855? *10*		(2)	(0.03)	(2J+1)S: other: 0.02. dσ/dΩ(max)≈0.11 mb/sr.
2182 *10*		2	0.23	(2J+1)S: other: 0.18. dσ/dΩ(max)=0.9 mb/sr.
2376 *10*		0	0.24	(2J+1)S: other: 0.22. dσ/dΩ(7.5°)=5.7 mb/sr. E(level),L: other: L=1 for a 2340 group (1965Bo36).

Continued on next page (footnotes at end of table)

^{70}Zn(d,p) 1967Vo05 (continued)

^{71}Zn Levels (continued)

E(level)	L[†]	(2J+1)S[@]	Comments
2417 *10*	2	0.09	(2J+1)S: other: 0.07. dσ/dΩ(max)=0.34 mb/sr.
2523[a] *10*	2	0.32	(2J+1)S: other: 0.25. dσ/dΩ(max)=1.3 mb/sr.
2538[a] *10*	(2)	(0.1)	(2J+1)S: other: 0.09. dσ/dΩ(max)=0.5 mb/sr.
2612 *10*	2	0.1	(2J+1)S: other: 0.08. dσ/dΩ(max)=0.39 mb/sr.
2713 *10*	2	0.05	(2J+1)S: other: 0.04. dσ/dΩ(max)=0.22 mb/sr.
2752 *10*	2	0.24	(2J+1)S: other: 0.19. dσ/dΩ(max)=1.0 mb/sr.
3039 *10*	2	0.20	(2J+1)S: other: 0.16. dσ/dΩ(max)=0.9 mb/sr.
3098 *10*	2	0.09	(2J+1)S: other: 0.07. dσ/dΩ(max)=0.44 mb/sr.
3178 *10*	2	0.20	(2J+1)S: other: 0.16. dσ/dΩ(max)=0.9 mb/sr.
3350[‡] *10*	0[‡]	0.03	(2J+1)S: other: 0.03. dσ/dΩ(7.5°)=0.66 mb/sr.
3412[‡] *10*	2[‡]	0.08	(2J+1)S: other: 0.07. dσ/dΩ(max)=0.41 mb/sr.
3498[‡] *10*	0[‡]	0.09	(2J+1)S: other: 0.07. dσ/dΩ(7.5°)=1.89 mb/sr.
3626[‡] *10*	2[‡]	0.21	(2J+1)S: other: 0.17. dσ/dΩ(7.5°)=1.1 mb/sr.
3654[‡] *10*			dσ/dΩ(7.5°)≈0.5 mb/sr.
3746[‡] *10*			E(level): 3750 (1965Bo36). dσ/dΩ(7.5°)=0.25 mb/sr.
3765[‡] *10*			dσ/dΩ(7.5°)=0.40 mb/sr.
3779[‡] *10*			dσ/dΩ(7.5°)=0.77 mb/sr.
3842[‡] *10*			dσ/dΩ(7.5°)=0.56 mb/sr.
3860[‡] *10*			dσ/dΩ(7.5°)=0.62 mb/sr.
3890[‡] *10*			dσ/dΩ(7.5°)=0.75 mb/sr.
3926[‡] *10*			dσ/dΩ(7.5°)=0.35 mb/sr.

[†] From comparison of σ(θ) distributions with DWBA calculations. For L(d,p)=2, 1967Vo05 propose $d_{5/2}$ neutron transfer in all cases suggesting J^{π}=5/2^{+}; for L=3, $f_{5/2}$; for L=4, $g_{9/2}$; and for L=1, $p_{1/2}$ for g.s. and $p_{3/2}$ transfer for 675 and 1421 levels.

[‡] According to 1967Vo05, data are incomplete or contributed by contaminants for this group. L-transfer for such a group is considered as tentative by the evaluators.

[#] Same L-transfer in 1965Bo36.

[@] (2J+1)S=[dσ/dΩ(max)(expt)]/[dσ/dΩ(max)(DWBA)]. Two sets of spectroscopic factors are listed by 1967Vo05 using different sets of optical-model parameters. The set of values in close agreement with the sum rule is given in the data field whereas the other is given under comments.

[&] 465 and 489 levels form an unresolved doublet.

[a] 2523 and 2538 levels form an unresolved doublet.

[b] Unresolved group.

[c] From empirical spin dependence of σ(θ) pattern for L(d,p)=1.