^{66}Zn(^{3}He,α) 1971Be42

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 202,59 (2025)	25-Feb-2025

Target J^{π}(^{66}Zn g.s.)=0^{+}.

1971Be42: E(^{3}He)=18 MeV from the Heidelberg EN Tandem accelerator. Target was 98.55% isotopically enriched ^{66}Zn. Reaction products were momentum-analyzed with a broad-range magnetic spectrograph (FWHM≈40 keV). Measured σ(Eα,θ), θ_{cm}=5°−35°. Deduced levels, L-transfers, spectroscopic factors from DWBA analysis. Uncertainty in cross-section is about 15%.

1967Bo39: E(^{3}He)=33 MeV from Argonne 60-inch cyclotron. Target was 97.8% enriched ^{66}Zn. Reaction products were detected with a counter telescope of surface barrier detectors (FWHM≈100 keV). Measured σ(Eα,θ), θ_{cm}=15°−40°. Deduced levels, L-transfers, spectroscopic factors from DWBA analysis.

^{65}Zn Levels

Spectroscopic factor is obtained using dσ/dΩ(exp)=N×C^{2}S×dσ/dΩ(DWBA), where N is normalization factor. N=35 is used in 1971Be42, larger than the recommended N=23 in 1977En02.

E(level)[†]	L[‡]	C^{2}S[‡]	Comments
0	3	4.00	C^{2}S: for J^{π}=5/2^{-}.
60 *20*	1	0.31	C^{2}S: for J^{π}=1/2^{-}.
120 *20*	1	1.96	
210 *20*	1	0.26	
770 *20*	3	0.14	C^{2}S: for J^{π}=5/2^{-}.
870[#] *20*	1	0.60	C^{2}S: for J^{π}=1/2^{-}.
920 *20*	1	0.12	
1070[#] *20*	4	0.65	
1260[#] *20*	3	0.22	
1370 *20*	(2)	0.15	L: 1, from DWBA analysis of $\sigma(\theta)$ (1967Bo39).
1480 *20*			
1590[#] *20*	3	0.31	
1950[#] *20*	(3)	0.17	L: 1, from DWBA analysis of $\sigma(\theta)$ (1967Bo39).
2230[#] *20*	(3)	0.18	L: 1, from DWBA analysis of $\sigma(\theta)$ (1967Bo39).
2440 *20*	(3)	0.19	
2530 *20*	3	0.23	
2690 *20*	(3)	0.25	C^{2}S: assumed J^{π} value not specified (1971Be42).
2820 *20*	(4)	0.14	
2880 *20*	3	0.28	
2930 *20*	3	0.14	
3040 *20*	(4)	0.18	
3120 *20*	1	0.58	
3170 *20*	3	0.10	
3250 *20*	(4)	0.28	
3580 *20*	3	0.17	
3920[#] *20*	(4)	0.22	
4100 *20*	2	0.19	
4270 *20*			
4490 *20*	3	0.20	
4580 *20*	(3)	0.20	C^{2}S: assumed J^{π} value not specified (1971Be42).
4660 *20*	3	0.16	
4770 *20*	3	0.19	
4920 *20*	(4)	0.13	
5000 *20*	(1)	0.11	C^{2}S: assumed J^{π} value not specified (1971Be42).
5360 *20*	(3)	0.17	C^{2}S: assumed J^{π} value not specified (1971Be42).

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^{66}Zn(^{3}He,α) 1971Be42 (continued)

^{65}Zn Levels (continued)

E(level)[†]	L[‡]	C^2S[‡]	Comments
5810 *20*	3	0.12	
7450 *20*	1	0.31	IAS of ^{65}Cu g.s.
8210 *20*	(1)		IAS of ^{65}Cu 770 level. L: from DWBA analysis of $\sigma(\theta)$ (1967Bo39).
8560 *20*			IAS of ^{65}Cu 1114 level.
8920 *20*			IAS of ^{65}Cu 1482 level.
9060 *20*			IAS of ^{65}Cu 1623 level.
9120 *20*			IAS of ^{65}Cu 1725 level.
9520 *20*			IAS of ^{65}Cu 2093 level.
10030?			E(level): from 1967Bo39.

† From 1971Be42.

‡ From DWBA analysis of $\sigma(\theta)$ data in 1971Be42. Quoted values of C^2S are for $J^\pi=3/2^-$ where L=1, $5/2^+$ (L=2), $7/2^-$ (L=3) and (L=4), except as noted. These values must be considered as approximate in absolute terms since they have been calculated using a normalization factor of 35 (1971Be42) which is somewhat larger than the recommended value of 23 (1977En02). Comparison with ^{66}Zn(p,d) data suggest C^2S should not be increased further.

Doublet.