^{64}Zn(^{3}He,α) 1967Be18,1967Bo39

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 196,17 (2024)	30-Sep-2023

1967Be18: E=18 MeV ^{3}He beam was produced from the Heidelberg Tandem Van de Graaff accelerator. Target was enriched ^{64}Zn. Reaction products were momentum-analyzed with a single-gap magnetic spectrograph at forward angles and detected with a ΔE-E telescope at large angles. Measured $\sigma(\theta)$, $\theta_{c.m.}\approx 0°$ to 110°. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis.

1967Bo39: E=33 MeV ^{3}He beam was produced from the Argonne 60-inch cyclotron. Target was 0.47 mg/cm^2 ^{64}Zn (98.5% enriched). Reaction products were detected with a ΔE-E counter telescope. Measured $\sigma(\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data.

1967Fo05: E=18 MeV ^{3}He beam was produced from the University of Pennsylvania Tandem accelerator. Targets were 100-150 μg/cm^2 self-supporting enriched ^{64}Zn metal foil. Reaction products were detected with surface barrier detectors. Measured $\sigma(\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis.

^{63}Zn Levels

E(level)[†]	J$^\pi$[‡]	L[#]	C^{2}S[#]	Comments
0.0	3/2$^-$	1	1.26	C^{2}S: others: 2.60 (1967Be18) for J=1/2, 1.5 (1967Fo05) for J=3/2.
192 *15*	5/2$^-$	3	3.12	E(level): other: 190 (1967Bo39,1967Fo05). C^{2}S: others: 6.20 (1967Be18), 2.3 (1967Fo05).
641 *15*	3/2$^-$	1	0.92	E(level): others: 640 (1967Bo39); unresolved multiplet of 627, 636, 649 and 694 (1967Fo05). C^{2}S: others: 1.70 (1967Be18), 1.0 (1967Fo05).
1065 *15*	7/2$^-$,1/2$^-$	3,1	0.45,0.37	E(level): other: 1050 (1967Bo39). C^{2}S: from 1967Be18. Other: 0.32 for L=3 and J=7/2 in 1967Bo39.
1216 *15*	7/2$^-$	3	0.27	E(level): other: 1220 (1967Bo39). C^{2}S: other: 0.36 (1967Be18).
1420				E(level): from 1967Bo39.
1704 *15*	7/2$^-$	3	0.78	E(level): others: 1680 (1967Bo39), 1640 (1967Fo05). C^{2}S: others: 0.69 (1967Be18) for J=7/2; 0.8 for J=5/2 (1967Fo05).
1924 *15*	3/2$^-$	1	0.15	E(level): other: 1910 (1967Bo39). C^{2}S: other: 0.23 (1967Be18).
2160 *15*				
2520 *15*				
2650 *15*	7/2$^-$	3	1.07	E(level): others: 2630 (1967Bo39), 2600 (1967Fo05). C^{2}S: others: 1.90 (1967Be18), 1.2 (1967Fo05).
2760 *15*	7/2$^-$	3[@]	0.50[@]	
2850 *15*	7/2$^-$	3[@]	0.25[@]	
2940 *15*	7/2$^-$	3[@]	0.26[@]	
3020 *15*	7/2$^-$	3[@]	0.55[@]	E(level): other: 3010 (1967Bo39).
3370 *15*	7/2$^-$	3	0.87	E(level): others: 3320+3360 doublet (1967Bo39); 3280 (1967Fo05). L,C^{2}S: from 1967Be18. Others: L=4, C^{2}S=0.66 for J=9/2 for a possible doublet of 3320+3360 (1967Bo39); 0.9 (1967Fo05).
4120	3/2$^-$	(1)	0.12	
4320	7/2$^-$	(3)	0.33	
4770				
5490	3/2$^-$	1	0.37	E(level): other: 5420, IAS of g.s. in ^{63}Cu (1967Fo05). C^{2}S: other: 0.4 (1967Fo05).
6830	7/2$^-$	3	0.69	E(level): other: 6800, IAS of 1420 level in ^{63}Cu (1967Fo05). C^{2}S: other: 0.1 for L=1 and J=3/2 (1967Fo05).
7320	7/2$^-$	3	0.62	

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^{64}Zn(^{3}He,α) 1967Be18,1967Bo39 (continued)

^{63}Zn Levels (continued)

† From 1967Be18 up to 3370 level and from 1967Bo39 above that.
‡ Value assumed for the extraction of C^2S.
# From DWBA analysis of measured $\sigma(\theta)$ in 1967Bo39, unless otherwise noted. Same L values for levels up to 3370 are also from 1967Be18. Note that C^2S values from 1967Be18 are about two times of values from 1967Bo39 for g.s., 192, 641 levels, so it is likely the actual values from 1967Be18 should be divided by a factor of 2.
@ From 1967Be18.