

$^{64}\text{Zn}(\text{pol p,d}),(\text{p,d})$ 1978Me17,1968Jo16

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

1978Me17: (pol p,d) E=18 MeV polarized proton beam was produced from the McMaster FN tandem. Target was 100 $\mu\text{g}/\text{cm}^2$ ^{64}Zn (>99.9% enriched). Reaction products were momentum-analyzed with an Enge split-pole magnetic spectrograph (FWHM=25 keV) and detected with an resistive wire position-sensitive proportional counter. Measured $\sigma(E_d, \theta)$, vector-analyzing power. Deduced levels, J, π , L-transfers, spectroscopic factors from DWBA analysis.

1968Jo16: (p,d) E=26 MeV proton beam was produced from the University of Colorado cyclotron. Target was enriched ^{64}Zn . Reaction products were detected with a Si(Li) counter telescope (FWHM=100 keV). Measured $\sigma(E_d, \theta)$. Deduced levels, J, π , L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data.

1966Mc15: (p,d) E=17.5 MeV proton beam was produced from the Princeton cyclotron. Target was about 1 mg/cm^2 isotopically enriched ^{64}Zn foil. Reaction products were detected with silicon surface barrier detectors. Measured $\sigma(E_d, \theta)$. Deduced levels, J, π , L-transfers, spectroscopic factors from DWBA analysis.

Other:

1976Gu08: E=23.3-42.4 MeV proton beams were produced from the Milan University AVF cyclotron. Target was 98.9% enriched ^{64}Zn . Reaction products were detected with a $\Delta\text{E-E}$ telescope of surface barrier detectors (FWHM=120 keV). Measured $\sigma(E_d, \theta)$. Deduced levels.

 ^{63}Zn Levels

E(level) [†]	J $\pi^{\ddagger}$	L [#]	C ² S [#]	Comments
0	3/2 ⁻ @	1	1.3	C ² S: from 1978Me17 for J=3/2. Others: 1.35 for J=3/2 (1966Mc15); 1.44 for J=1/2 (1968Jo16).
193	5/2 ⁻ @	3	2.27	E(level): others: 200 30 (1966Mc15), 200 (1968Jo16). C ² S: others: 2.8 (1966Mc15), 2.9 (1978Me17).
248	1/2 ⁻ @	1	0.21	L, C ² S: from 1978Me17.
640 30	1/2 ⁻ @	1	0.59	E(level): from 1966Mc15. Others: unresolved triplet of 627+637+650 in 1978Me17; 640 (1968Jo16). C ² S: others: 0.27 for L=1 and J=1/2, 0.12 for L=1 and J=3/2, <0.3 for L=3 and J=5/2 (1978Me17); 0.84 for L=1 and J=1/2 (1966Mc15).
1023	3/2 ⁻ @	1	0.38	E(level): others: 1040 30 with L=(3+1) (1966Mc15) probably a doublet of 1023+1064; 1040 (1968Jo16). L: from 1978Me17. Others: 1(+3) from 1968Jo16, (3+1) from 1966Mc15. C ² S: from 1978Me17. Others: 0.13 for L=1 component (1968Jo16); 0.7 for L=3 component (1966Mc15).
1064	7/2 ⁻	(3)	0.37	E(level): 1064+1066 unresolved doublet (1978Me17). L: assumed to be L=3 component of L=1+3 for the unresolved doublet (1978Me17). C ² S: others: 0.37 for L=3 and J=7/2 component (1978Me17); 0.7 for J=5/2 and L=3 of a possible doublet at 1040 (1966Mc15).
1066	1/2 ⁻	(1)	0.21	E(level): 1064+1066 unresolved doublet (1978Me17). L: assumed to be L=1 component of L=1+3 for the unresolved doublet (1978Me17).
1207	7/2 ⁻ @	3	0.22	E(level): others: 1220 30 with L=(3+1) (1966Mc15), 1220 (1968Jo16). C ² S: others: 0.63 (1978Me17) and 0.25 (1966Mc15) for L=3.
1284		(3)		E(level), L: from 1978Me17.
1392		(1)		E(level): others: 1420 30 with L=(3+1) from 1966Mc15 and 1420 with L=1 from 1968Jo16 are likely doublet of 1392 and 1436 levels in 1978Me17. C ² S: 0.06 for L=1 and J=3/2 for a peak at E=1420 (1968Jo16).
1436		(3)		L: other: (3+1) from 1966Mc15. C ² S: 0.25 for L=3 component for a peak at E=1420 30 (1966Mc15).
1680 30	7/2 ⁻	3	0.62	E(level): from 1966Mc15. Other: 1680 (1968Jo16). L: other: (3+1) from 1966Mc15. C ² S: other: 0.85 for L=3 component (1966Mc15).
1910 30	3/2 ⁻	1	0.09	E(level): from 1966Mc15. Other: 1910 (1968Jo16). L: other: (3+1) from 1966Mc15.

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$^{64}\text{Zn}(\text{pol p,d}),(\text{p,d})$ 1978Me17,1968Jo16 (continued) ^{63}Zn Levels (continued)

<u>E(level)[†]</u>	<u>Jπ[‡]</u>	<u>L[#]</u>	<u>C²S[#]</u>	<u>Comments</u>
2160	3/2 ⁻	1	0.07	C ² S: other: 0.3 for L=3 component (1966Mc15).
2520	3/2 ⁻	1	0.06	
2640	7/2 ⁻	3	0.81	
				E(level): from 1966Mc15. Other: 2640 (1968Jo16).
				L: other: (3+1) from 1966Mc15.
				C ² S: other: 0.4 for L=3 component (1966Mc15).
2760	7/2 ⁻	3	0.18	L: 2 also possible (1968Jo16).
2850	7/2 ⁻	3	0.20	
3010	7/2 ⁻	3	0.24	
3380	7/2 ⁻	3	0.51	
3960	3/2 ⁻	1	0.01	
4320	7/2 ⁻	3	0.28	
4800	7/2 ⁻	3	0.19	
5320	3/2 ⁻	(1)	0.24	
6640	7/2 ⁻	3	0.28	
7160	7/2 ⁻	3	0.35	

[†] From 1978Me17 up to 1436 level, and from 1968Jo16 above that, unless otherwise noted.

[‡] Assumed for extracting C²S, unless otherwise noted.

[#] From DWBA analysis of measured $\sigma(\theta)$ in 1968Jo16, unless otherwise noted.

[@] From vector-analyzing power (1978Me17).