^{63}Cu(p,p′) 1957Ma23,1981Iw02,1966Mc10

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

Target $J^{\pi}(^{63}Cu$ g.s.)=3/2$^-$.

1957Ma23: E=6.51 MeV proton beam was produced from MIT electrostatic accelerator. Scattered protons were momentum-analyzed with a high-resolution magnetic spectrograph. Measured proton spectra. Deduced levels.

1981Iw02: E=40 MeV proton beam was produced from the Michigan State University Isochronous Cyclotron. Target was 520 μg/cm^2 self-supporting metallic foil of ^{63}Cu. Reaction products were momentum-analyzed with an Enge split-pole magnetic spectrograph (FWHM=16 keV). Measured $\sigma(E_p,\theta)$. Deduced levels, L-transfers from DWBA analysis.

1966Mc10: E=17.5 MeV proton beam was produced from the Princeton FM cyclotron. Scattered protons were detected with surface-barrier detectors (FWHM≈40 keV) Measured $\sigma(\theta)$. Deduced levels, J, π, deformation parameters from DWBA analysis.

Other: 1979Iw03.

^{63}Cu Levels

E(level)[†]	L[‡]	β_L[&]	Comments
0			
668 *5*	2	0.243 *11*	E(level): others: 670 *10* (1981Iw02), 668 *10* (1966Mc10).
961 *5*	2	0.265 *11*	E(level): others: 960 *10* (1981Iw02), 961 *10* (1966Mc10).
1327 *5*	2	0.234 *10*	E(level): others: 1330 *10* (1981Iw02), 1327 *10* (1966Mc10).
1412 *5*	2	0.110 *10*	E(level): others: 1410 *10* (1981Iw02), 1412 *10* (1966Mc10).
1547 *5*	2		E(level): others: 1550 *10* (1981Iw02), 1547 *10* (1966Mc10).
1862 *5*	2+4		E(level): others: 1860 *10* (1981Iw02), 1862 *10* (1966Mc10).
2012 *5*	2		E(level): other: 2010 *10* (1981Iw02).
2063 *5*			
2082 *5*	#		E(level): other: 2080 *10* (1981Iw02).
2093 *6*	#		
2210 *6*	4		E(level): others: 2210 *10* (1981Iw02,1966Mc10).
2337 *6*	4		E(level): other: 2340 *10* (1981Iw02).
2405 *6*	2+4		E(level): other: 2410 *10* (1981Iw02).
2497 *6*			
2504 *6*			
2510 *6*	3	0.202 *12*	E(level): others: 2510 *10* (1981Iw02) and 2500 *10* (1966Mc10), likely triplet of 2497+2504+2510.
2535 *6*	@		
2543 *10*	@		E(level): other: 2540 *10* (1981Iw02).
2673 *8*	4		E(level): others: 2680 *10* (1981Iw02), 2670 *10* (1966Mc10).
2694 *8*			
2716 *8*			
2761 *8*			
2778 *8*			
2805 *8*			
2831 *8*			
2856 *8*			
2869 *8*			
2888 *8*			
2958 *8*			
2974 *8*			
3032 *8*			
3042 *8*			
3099 *8*			
3129 *8*			
3183 *8*			
3208 *8*			
3225 *8*			
3249 *8*			

Continued on next page (footnotes at end of table)

^{63}Cu(p,p′) 1957Ma23,1981Iw02,1966Mc10 (continued)

^{63}Cu Levels (continued)

E(level)†	L‡	β_L&	Comments
3294 *8*			
3311 *8*	3	0.210 *12*	E(level): others: 3320 *10* (1981Iw02), 3300 *10* (1966Mc10).
3370 *8*			
3404 *8*			
3417 *8*			
3431 *8*			
3458 *8*			
3476 *8*	3	0.198 *20*	E(level): others: 3480 *10* (1981Iw02,1966Mc10).
3720 *20*	3		E(level): other: 3700 *10* (1966Mc10).
3810 *20*	3		
3840 *20*	3		E(level): other: 3830 *10* (1966Mc10).
3890 *20*	3		

† From 1957Ma23 for E<3500 and from 1981Iw02 for others.
‡ From comparison of $\sigma(\theta)$ with shapes for levels with known J^π (1981Iw02). Empirical L assignments corroborated by DWBA calculation.
# L=2+4 for a level at 2080 *10* (1981Iw02).
@ L=4 for a level at 2540 *10* (1981Iw02).
& Deformation parameters are from DWBA analysis of measured $\sigma(\theta)$ in 1966Mc10.