^{65}Cu(p,p′) 1967Br10

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

Target $J^{\pi}(^{65}Cu$ g.s.)=3/2$^-$.

1967Br10: E=10.89 MeV proton beam was produced from the Harwell tandem generator. Target was 99.4% enriched ^{65}Cu with a thickness of 100 μg/cm^2 on a carbon backing. Scattered protons were momentum-analyzed with the ARRE Harwell single-channel magnetic spectrography (FWHM=11 keV). Measured σ(E(p)). Deduced levels. Comparisons with available data.

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 σ(E(p),θ), θ_{cm}≈25°−100°. Deduced levels, J, π, L-transfers, deformation parameters from DWBA analysis.

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.

1969An34: E=6 MeV. Measured σ(E(p),θ). Deduced L-transfer, deformation parameter.

For level density measurements see 1967Jo03, 1972Lu03, 1974Pa06.

Others: 1995Ro30, 1972Do05, 1969An34, 1969Le06.

^{65}Cu Levels

E(level)[†]	L[‡]	β_L[‡]	Comments
0			
771 *4*	2	0.200 *10*	E(level): weighted average of 776 *10* (1967Br10), 770 *10* (1966Mc10), 770 *4* (1957Ma23).
1114[#] *4*	2	0.220 *14*	E(level): others: 1111 *10* (1967Br10), 1114 *10* (1966Mc10).
1482[#] *4*	2	0.195 *14*	E(level): others: 1484 *10* (1967Br10), 1482 *10* (1966Mc10).
1623[#] *4*	2	0.078 *7*	E(level): others: 1619 *10* (1967Br10), 1623 *10* (1966Mc10).
1724 *6*			E(level): weighted average of 1719 *10* (1967Br10), 1725 *10* (1966Mc10), 1724 *6* (1957Ma23).
2090 *8*	(2)[@]		E(level): weighted average of 2086 *10* (1967Br10) and 2093 *8* (1957Ma23).
2103 *8*			E(level): weighted average of 2101 *10* (1967Br10) and 2105 *8* (1957Ma23).
2208 *8*			E(level): weighted average of 2200 *10* (1967Br10) and 2213 *8* (1957Ma23).
2277 *8*			E(level): weighted average of 2271 *10* (1967Br10) and 2280 *8* (1957Ma23).
2326 *8*			E(level): weighted average of 2320 *10* (1967Br10) and 2329 *8* (1957Ma23).
2402 *8*			E(level): weighted average of 2398 *10* (1967Br10) and 2404 *8* (1957Ma23). 1957Ma23 note that this level could be a doublet, but there is no other level nearby from other (p,p′) studies.
2527 *8*	3	0.202 *10*	E(level): weighted average of 2526 *10* (1967Br10), 2520 *10* (1966Mc10), 2531 *8* (1957Ma23).
2592 *8*			E(level): weighted average of 2588 *10* (1967Br10) and 2594 *8* (1957Ma23).
2644 *10*			E(level): others: 2648 *8* (1957Ma23, possible doublet).
2654 *10*			
2749 *8*			E(level): weighted average of 2747 *10* (1967Br10) and 2751 *8* (1957Ma23).
2836 *8*			E(level): weighted average of 2832 *10* (1967Br10) and 2839 *8* (1957Ma23).
2855 *10*			E(level): weighted average of 2859 *10* (1967Br10) and 2850 *10* (1966Mc10). Other: 2861 *8* (1957Ma23, possible doublet).
2868 *10*			
2889 *10*			E(level): other: 2894 *8* (1957Ma23, possible doublet).
2901 *10*			
2979 *10*			E(level): weighted average of 2977 *10* (1967Br10) and 2980 *10* (1966Mc10). 2979 *8* (1957Ma23, possible doublet).
2993 *10*			
3033 *8*			E(level): weighted average of 3029 *10* (1967Br10) and 3036 *8* (1957Ma23).
3077 *10*	3		E(level): weighted average of 3074 *10*, 3080 *10* (1966Mc10), 3078 *10* (1957Ma23).
3090 *10*			
3137 *10*			
3159 *10*			
3232 *10*			
3256 *10*			
3273 *10*			
3320 *10*			

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^{65}Cu(p,p′) 1967Br10 (continued)

^{65}Cu Levels (continued)

E(level)†	L‡	β_L‡	Comments
3331 *10*			
3349 *10*	3	0.206 *18*	E(level): weighted average of 3347 *10* (1967Br10) and 3350 *10* (1966Mc10).
3359 *10*			
3392 *10*			
3407 *10*			
3427 *10*			
3451 *10*			
3470 *10*			
3482 *10*			
3500 *10*	3		E(level): weighted average of 3499 *10* (1967Br10) and 3500 *10* (1966Mc10).
3513 *10*			
3541 *10*			
3557 *10*			
3576 *10*			
3595 *10*			
3625 *10*			
3646 *10*			
3656 *10*			
3685 *10*			
3718 *10*			E(level): weighted average of 3715 *10* (1967Br10) and 3720 *10* (1966Mc10).
3728 *10*			
3746 *10*			
3777 *10*			
3796 *10*			
3808 *10*			
3816 *10*			
3851 *10*			
3881 *10*			
3894 *10*			
3904 *10*			
3923 *10*			
3955 *10*			
3961 *10*			
3979 *10*			
3999 *10*			
4014 *10*			
4031 *10*			
4047 *10*			E(level): weighted average of 4044 *10* (1967Br10) and 4050 *10* (1966Mc10).
4057 *10*			
4079 *10*			
4092 *10*			
4116 *10*			
4125 *10*			
4142 *10*			
4157 *10*			
4182 *10*			
4195 *10*			
4232 *10*			
4245 *10*			
4264 *10*			
4290 *10*			
4304 *10*			
4320 *10*			
4335 *10*			
4358 *10*			
4366 *10*			
4383 *10*			

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^{65}Cu(p,p′) 1967Br10 (continued)

^{65}Cu Levels (continued)

E(level)†	E(level)†	E(level)†	E(level)†
4408 *10*	4523 *10*	4668 *10*	4795 *10*
4417 *10*	4535 *10*	4682 *10*	4808 *10*
4430 *10*	4557 *10*	4706 *10*	4822 *10*
4446 *10*	4571 *10*	4720 *10*	4848 *10*
4476 *10*	4598 *10*	4736 *10*	
4490 *10*	4616 *10*	4759 *10*	
4513 *10*	4647 *10*	4778 *10*	

† From 1967Br10, unless otherwise noted.
‡ L-transfer and deformation parameter (β_L) are extracted from DWBA analysis of measured $\sigma(\theta)$ in 1966Mc10, by comparing and normalizing calculated DWBA $\sigma(\theta)$ of L=2 and L=3 of ^{64}Ni(p,p′) to measured $\sigma(\theta)$, unless otherwise noted.
# From 1957Ma23.
@ From DWBA analysis of $\sigma(\theta)$ data in 1969An34.