

$^{64}\text{Ni}(\alpha, ^3\text{He})$ 1970Ro22,2013ScZZ

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

Target $J^\pi(^{64}\text{Ni g.s.})=0^+$.

1970Ro22: E=44 MeV α beam was produced from the Saclay cyclotron. Reaction products were detected with a solid-state analyzer (FWHM=100-150 keV). Measured $\sigma(E_{^3\text{He}}, \theta)$, $\theta \approx 10^\circ - 70^\circ$. Deduced levels, J, π , L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data and theoretical calculations.

2013Sc06,2013ScZZ: E=38 MeV α beam was produced from Yale tandem accelerator of WNSL facility. Target was $160 \mu\text{g}/\text{cm}^2$ ^{62}Ni (91.0% enriched). Reaction products were momentum-analyzed with a split-pole Enge spectrograph (FWHM \approx 50 keV). Measured $\sigma(E_{^3\text{He}}, \theta)$. Deduced levels, J, π , spectroscopic factors from DWBA analysis. Comparison with shell-model calculations. Cross section are from **2013ScZZ**.

Others:

1961Sa09: E=43 MeV from the Saclay cyclotron. Measured energy spectrum.

1995Fo19: E=120 MeV from the AVF cyclotron at KVI Groningen. Measured neutron decay of high-lying unbound states.

 ^{65}Ni Levels

Spectroscopic factor is obtained from $d\sigma/d\Omega(\text{exp})=N \times (2J+1)C^2S \times d\sigma/d\Omega(\text{DWBA})$, where J is the spin of the final level and N is the normalization factor (**1970Ro22**).

[Additional information 1.](#)

E(level) [†]	L [‡]	(2J+1)C ² S [‡]	Comments
0	3	2.4	$d\sigma/d\Omega=0.46$ mb/sr at 7° (2013ScZZ).
69	(1)	0.68	$d\sigma/d\Omega=0.13$ mb/sr at 7° (2013ScZZ).
690	2	0.20	note that L=2 reported for this level (1970Ro22) is in disagreement with adopted $J^\pi=3/2^-$.
1020	4	4.0	$d\sigma/d\Omega=2.79$ mb/sr at 7° (2013ScZZ).
1420	1	0.32	
1500	4	0.07	
1594 [#]			$d\sigma/d\Omega < 0.013$ mb/sr at 7° (2013ScZZ).
1930	2	0.60	
2130	1	0.60	
2336 [#]			$d\sigma/d\Omega=0.36$ mb/sr at 7° (2013ScZZ).
2510	4	1.40	
2829 [#]			$d\sigma/d\Omega=0.201$ mb/sr at 7° (2013ScZZ).
2940	2	0.48	
3100	(3,4)		
3230	(4,3)		(2J+1)C ² S: 0.16 for L=4, 0.66 for L=3 (1970Ro22).
3700	2	0.57	

[†] From **1970Ro22**, unless otherwise noted. **1970Ro22** state that the uncertainty in excitation energy ranges from 10 keV to 80 keV depending on the level position relative to the reference and the statistics.

[‡] From DWBA analysis of measured $\sigma(\theta)$ data in **1970Ro22**.

[#] From **2013ScZZ**.