^{64}Ni(α,α') 1987Ba78,1985Al24,1970Br07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178,41 (2021).	12-Nov-2021

Measured $\sigma(\theta)$. Optical model parameters deduced from elastic scattering and deformation parameters from inelastic scattering data. Coupled-channel and DWBA analyses of $\sigma(\theta)$ data. Also includes (α,α'):giant resonance.

1987Ba78: E=25 MeV beam from the AVF Radial Ridge cyclotron of the University of Birmingham. Scattered particles were momentum-analyzed with a magnetic spectrometer (FWHM=100-200 keV).

1985Al24: E=172.5 MeV beam from the Julich isochronous cyclotron. Scattered particles were detected with two ΔE-E telescopes (FWHM≈250 keV).

1970Br07: E=44 MeV beam from the Saclay fixed-energy cyclotron. Scattered α particles were momentum-analyzed with a magnetic spectrometer.

1992Yo01: E=130 MeV. Measured GQR at 15.6 MeV and $\sigma(\theta)$ for the first 2^+ and 3^- states.

Others:

(α,α'): 1993Me18 (97.3 MeV, giant resonance), 1989Ai02 (29-50 MeV), 1975Bo02 (48 MeV), 1975Al12 (27 MeV), 1974Tr04 (18-27 MeV), 1974Co28 (24-32 MeV), 1972Re15 (104 MeV), 1972Ba36 (18 MeV), 1971Go36 (38 MeV), 1970Sp01 (104 MeV), 1970Iv02 (19.5 MeV), 1968He13 and 1972He23 (30 MeV), 1968Go35 (40 MeV), 1968Fu01 (21 MeV), 1966Br19 (also 1963Br29,1963Ba45) (44 MeV), 1960Be14 (44 MeV).

(α,α): 1990Fi07 (57 MeV), 1982En04 (25 MeV), 1978Pi03 (48 MeV), 1974Ma04 (60 MeV), 1969Ha14 (104 MeV).

Others: 1980DaZL (also 1978BuZZ), 1973EbZY, 1972LeXV, 1972CrZL, 1972BrXV, 1970HaYV.

Additional information 1.

^{64}Ni Levels

E(level)[†]	J$^\pi$	L	Comments
0	0^+		
1348[‡]		2	L: from 1987Ba78. β_2=0.129 (1987Ba78); 0.139 *2* or 0.149 *1* (1985Al24); 0.19 (1975Al34); 0.16 (1974Tr04); 0.17 *2* (1974Co28); 0.16 (1972Re15); −0.14 (1971Go36). Sign of β_2 deduced from relative phase of elastic and inelastic $\sigma(\theta)$ (1971Go36). β_2R=0.96 (1992Yo01), 0.99 fm *5* (1975Al12), 0.89 fm *9* (1970Br07). B(E2)(W.u.)=8 (1987Ba78), 10.3 (1985Al24), 10.8 (1970Br07).
2280			E(level): from 1987Ba78. J$^\pi$: suggested as 0^+ (1987Ba78), but adopted J^π is $(2)^+$.
2600[‡]		4(+2)	L: from 1987Ba78. β_4=0.042 (1987Ba78), 0.032 *2* (1985Al24). β_4R=0.24 fm *2* (1970Br07). B(E4)(W.u.)=1.0 (1987Ba78), 1.6 or 1.7 (1985Al24), 0.85 (1970Br07).
3160		2	E(level): from 1985Al24. Others: 3170 (1987Ba78), 3200 (1970Br07). L: from 1987Ba78, 1985Al24 and 1970Br07, but 1972He23 quote L(α,α')=4 from their unpublished results. A level near this energy is assigned L=4 in (e,e′) (3163 level) and (p,p′) (3165 level). There are either two separate levels or L-assignment is suspect. β_2=0.05 (1987Ba78), 0.04 (1985Al24). β_2R=0.34 fm *3* (1970Br07). B(E2)(W.u.)=1.2 (1987Ba78), 0.5 or 0.8 (1985Al24), 1.6 (1970Br07). E(level),L: 1970Br07 give a single group at 3200 with L=2.
3277[#]		2[#]	
3580[‡]		3	L: from 1987Ba78. β_3=0.108 (1987Ba78), 0.123 *2* or 0.133 *2* (1985Al24), 0.16 (1975Al34), 0.15 *2* (1974Co28). β_3R=0.78 (1992Yo01), 0.84 *6* (1975Al12), 0.73 *7* (1970Br07). B(E3)(W.u.)=5.7 (1987Ba78), 13.0 or 14.1 (1985Al24), 7.45 (1970Br07), 2.7 (1963Br29).
3745[#]		(4)[#]	
3856 *15*		5	E(level),L: from 1968He13.
4089[#]		(4,5)[#]	
4600[‡]			
5378[#]		(3)[#]	

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^{64}Ni(α,α') 1987Ba78,1985Al24,1970Br07 (continued)

^{64}Ni Levels (continued)

E(level)[†]	$T_{1/2}$	Comments
15.60×10^3 *30*	5.64 MeV *40*	E(level): giant quadrupole resonance from 1992Yo01. $T_{1/2}$: resonance width (1992Yo01). %EWSR=90 *16* (1992Yo01).

[†] Estimated uncertainty ≈20 keV (evaluator).
[‡] From 1985Al24.
[#] Energy from (t,α) (1972He23) and L(α,α') quoted by 1972He23 in their unpublished (α,α') work.