

$^{72}\text{Ge}(\text{p},\text{d})$ 1975ShYV,1973Fo01

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 188,1 (2023)	17-Jan-2023

1975ShYV: E(p)=35 MeV from the MSU cyclotron. Measured $\sigma(\theta)$ from 6° to 60° using an Enge split-pole magnetic spectrograph, FWHM ≈ 8 keV. Deduced levels, L-transfers, Spectroscopic factors from DWBA analysis.

1973Fo01: E(p)=20 MeV from the Chalk River MP tandem. Measured $\sigma(\theta)$, $\theta=15^\circ$ to 65° with E- Δ E detectors, FWHM=30-40 keV. Deduced levels, L-transfers, spectroscopic factors from DWBA analysis.

 ^{71}Ge Levels

Cross sections under comments are from **1973Fo01** and correspond to an angle where it is maximum.

E(level) [†]	L [‡]	C ² S [†]	Comments
0	1 ^a	0.86 [@]	C ² S: 1.04 (1973Fo01). d σ /d Ω (max)=3.05 mb/sr.
174 1	3	3.72 [@]	L: 3+4 for 186 5 group (1973Fo01): composite of 174+198. C ² S: 3.64 for L=3, 1.93 for L=4 (1973Fo01). d σ /d Ω (max)=1.20 mb/sr for 186 doublet.
198 1	4	1.97 ^{&}	
500 1	1 ^a	1.61 ^{&}	E(level): 502 5 (1973Fo01). C ² S: 2.32 (1973Fo01). d σ /d Ω (max)=5.0 mb/sr.
524 1	2	0.18 ^{&}	
708 1	1 ^a	0.14 ^{&}	E(level): 706 7 (1973Fo01). d σ /d Ω (max)=0.45 mb/sr. C ² S: 0.17 (1973Fo01).
747 1	3 ^a	0.38 [@]	E(level): 757 10 (1973Fo01). C ² S: 0.31 (1973Fo01). d σ /d Ω (max)=0.055 mb/sr.
807 10	2	0.03 ^{&}	E(level),L,C ² S: from 1973Fo01 . Level (at 807) is uncertain in 1975ShYV . L=2 is inconsistent with 1/2 ⁽⁻⁾ in Adopted Levels. d σ /d Ω (max)=0.05 mb/sr.
831 1	1	0.01 ^{&}	
1026 2	3	0.16 [@]	L=2, S=0.03 for 1025 7 group (1973Fo01), L+1/2 assumed L=2 is inconsistent with 5/2 ⁻ in Adopted Levels. d σ /d Ω (max)=0.05 mb/sr.
1095 2	1 ^a	0.29 ^{&}	E(level): 1096 5 (1973Fo01). C ² S: 0.37 (1973Fo01). d σ /d Ω (max)=0.72 mb/sr.
1166 10	1	0.05 ^{&}	E(level),L,C ² S: from 1973Fo01 . Level (E=1169) uncertain in 1975ShYV . L: 1+3 for 1166+1207 group (1973Fo01). L=1 is in disagreement with 5/2 ⁺ in Adopted Levels. d σ /d Ω (max)=0.15 mb/sr for 1166+1207.
1207 [‡] 2	3 ^a	0.19 [@]	E(level): 1210 10 (1973Fo01). C ² S: 0.40 (1973Fo01).
1288 2	1 ^a	0.12 ^{&}	E(level): 1288 5 (1973Fo01). d σ /d Ω (max)=0.36 mb/sr. C ² S: 0.18 (1973Fo01).
1349 2	0	0.01	L=2, S=0.03 (5/2 ⁺ assumed) for 1354 10 level (1973Fo01). L=2 is inconsistent with L=0 in (d,p). d σ /d Ω (max)=0.05 mb/sr.
1379 2			
1408 [‡] 2	3 ^a	0.14 [@]	E(level): 1410 10 (1973Fo01).

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$^{72}\text{Ge}(\text{p,d})$ 1975ShYV,1973Fo01 (continued) ^{71}Ge Levels (continued)

<u>E(level)[†]</u>	<u>L^{†#}</u>	<u>C²S[†]</u>	<u>Comments</u>
1506 2	3 ^a	0.40 [@]	C ² S: 0.26 (1973Fo01). dσ/dΩ(max)=0.05 mb/sr. E(level): 1507 5 (1973Fo01). C ² S: 0.53 (1973Fo01). dσ/dΩ(max)=0.09 mb/sr.
1558 2	3	0.07 [@]	
1598 2	1 ^a	0.04 ^{&}	E(level): 1595 7 (1973Fo01). C ² S: 0.09 (1973Fo01). dσ/dΩ(max)=0.16 mb/sr.
1743 3	1 ^a	0.04 ^{&}	E(level): 1742 5 (1973Fo01). C ² S: 0.09 (1973Fo01). dσ/dΩ(max)=0.11 mb/sr.
1780 3	3 ^a	0.23 [@]	E(level): 1786 8 (1973Fo01). C ² S: 0.42 (1973Fo01). dσ/dΩ(max)=0.09 mb/sr.
1963 3	1 ^a	0.11 ^{&}	E(level): 1966 5 (1973Fo01). C ² S: 0.18 (1973Fo01). dσ/dΩ(max)=0.25 mb/sr.
1979 3			
2031 3	1	0.02 ^{&}	
2045 3			
2221 3	0	0.02	
2241 3			
2256 3			
2279 3	1	0.03 ^{&}	
2348 4	1 ^a	0.10 ^{&}	E(level): 2354 5 (1973Fo01). C ² S: 0.18 (1973Fo01). dσ/dΩ(max)=0.19 mb/sr.
2384 4	3	0.14 [@]	
2479 4			
2487 4	0	0.01	
2675 4	1	0.03 ^{&}	
2697 4			
2709 4	4	0.09 ^{&}	
2778 4	1	0.02 ^{&}	
2865 4	0	0.03	
2889 4	1	0.02 ^{&}	
2913 4	2	0.02 ^{&}	
2950 4			
3100 5			
3195 5			
3217 5			
3232 5			
3263 5			
3287 5	1	0.07 ^{&}	
3369 5	1	0.02 ^{&}	
3518 5	1	0.01 ^{&}	
3533 5			
3556 5			
3568 5			
3667 6			

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$^{72}\text{Ge}(\text{p,d})$ [1975ShYV](#),[1973Fo01](#) (continued) ^{71}Ge Levels (continued)

<u>E(level)[†]</u>	<u>L[‡]</u>	<u>C²S[†]</u>	<u>E(level)[†]</u>	<u>L[‡]</u>	<u>C²S[†]</u>	<u>E(level)[†]</u>
3677 6			3900 6	1	0.02&	3986 6
3769 6	3	0.11@	3932 6	1	0.02&	4066 6
3790 6	1	0.12&	3961 6			4230 6
						4388 7

[†] From [1975ShYV](#). Uncertainty in level energies is stated in [1975ShYV](#) as 1.5 keV/1 MeV. Values from [1973Fo01](#) are given under comments.

[‡] Doublet.

From comparison of $\sigma(\theta)$ distributions with DWBA predictions. [1975ShYV](#) consider the following orbitals as the most probable for pickup of neutron at low excitation energies: $p_{1/2}$ or $p_{3/2}$ orbitals for L=1, $2d_{5/2}$ for L=2, $f_{5/2}$ for L=3 and $g_{7/2}$ for L=4.

@ For L-1/2.

& For L+1/2.

^a Same L transfer reported in [1973Fo01](#).