^{74}Ge(^{3}He,d) 1976Sc13,1974Be54,2009Ka06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alexandru Negret, Balraj Singh	NDS 114, 841 (2013)	30-Jun-2013

1976Sc13: E=23 MeV; magnetic spectrograph with FWHM=6 keV below 1100 keV and multigap magnetic spectrograph with FWHM≈30 keV above 1100 keV. Cross section uncertainties≈15%; enriched targets; measured $\sigma(\theta)$. DWBA calculations.

1974Be54, 1971Be30: E=17 MeV; multiangle spectrograph with FWHM≈18-24 keV. Cross section uncertainty≈10%; enriched target; measured $\sigma(\theta)$. DWBA calculations.

2009Ka06 (also 2008KaZT): E=73 MeV beam provided by the AVF cyclotron at RCNP, Osaka. Enriched target. The outgoing deuterons were detected with Grand Raiden magnetic spectrometer, with an angular aperture of ±1.1°. FWHM=18 keV. Measured precise absolute cross sections and relative cross sections where these are maximum for the relevant L transfer, angular distributions. Spectroscopic factors deduced from DWBA analysis using PTOLEMY code and six different sets of optical-model potential parameters and two bound-state potential parameters. Differences in (2J+1)C^{2}S values were less than 10% for different sets of used parameters. Polarized deuteron beam is also used to obtain asymmetries and subsequent information about parities of levels. Uncertainty in cross sections: statistical uncertainty of 1% for strong peaks; systematic uncertainties of 5% in absolute values and 3% in relative values. Multiplets have larger uncertainties.

Measured cross sections (2008KaZT)

Level keV	dσ/dΩ(4.5°) mb/sr	dσ/dΩ(8°) mb/sr	dσ/dΩ(12°) mb/sr
0	4.73 a	1.49	0.73
199	0.87 a	0.24	0.17
265	2.83 *30* a	0.76	0.48
280	3.44	3.37 *37* a	1.91
304	2.98	3.28	2.43 24 a
469	3.35 a	0.89	0.59
572	0.070	0.085 a	0.055
822	0.26	0.26 a	0.22
1075	1.37 a	0.77	0.36
1297	0.32	0.13	0.070
1309	0.24	0.27	0.066
1349	0.39 a	0.15	0.095
1431	b	b	b
1431	0.34 b	0.21 b	0.12 *2* ab
1808	1.21	1.14	0.87 a
2111	0.15 a	0.047	0.024
2240	0.20 a	0.061	0.046
2380	0.22 a	0.062	0.041
2528	0.059	0.080	0.006
2528	0.53	0.16	0.12 *3* a

a: cross section used to deduce the spectroscopic factors.
b: total cross section is given with L=4, 1431 group

^{75}As Levels

E(level)†	L†	(2J+1)C^{2}S‡	Comments
0.0	1	1.42	(2J+1)C^{2}S: 1.00 in 2008KaZT.
201.2 *24*	1	0.19	(2J+1)C^{2}S: for J=1/2$^-$. (2J+1)C^{2}S: 0.18 in 2008KaZT.
263.3& *13*	1[b]	0.82	(2J+1)C^{2}S: 0.60 in 2008KaZT.
279.5& *17*	3[b]	5.45	(2J+1)C^{2}S: 2.54 in 2008KaZT.
303.7& *11*	4[b]	4.93	(2J+1)C^{2}S: 2.73 in 2008KaZT.

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^{74}Ge(^{3}He,d) 1976Sc13,1974Be54,2009Ka06 (continued)

^{75}As Levels (continued)

E(level)[†]	Jπ	L[†]	(2J+1)C^{2}S[‡]	Comments
399.7 *15*		2	0.58	
468.9 *10*	1/2$^-$[@]	1	1.32	(2J+1)C^{2}S: for J=1/2$^-$. (2J+1)C^{2}S: 0.71 in 2008KaZT.
572	5/2$^-$[@]	3	0.062	E(level),Jπ,L,(2J+1)C^{2}S: from new level in 2008KaZT.
585?[#] *7*		1	0.03	E(level): not reported by 1976Sc13.
821 *5*		3	0.60	L: from 1974Be54, 2008KaZT; 1976Sc13 report L=4 or 3. (2J+1)C^{2}S value for J=7/2$^-$.
862 *5*		0	0.10	L,(2J+1)C^{2}S: from 1974Be54.
1048 *5*		3,4	0.16,0.18	
1070 *5*		1	0.18	(2J+1)C^{2}S: 0.29 in 2008KaZT.
1131 *10*		1	0.04	L: from 1974Be54. 1976Sc13 report L=0 or 1.
1213?[#] *7*		1	0.04	E(level): not reported by 1976Sc13 and 2008KaZT.
1297[#a] *7*		2	0.17	
1309[a]	7/2$^-$[@]	3		
1352 *5*		1	0.09	(2J+1)C^{2}S: 0.084 in 2008KaZT.
1435 *5*		1+4[d]	0.06+0.31	(2J+1)C^{2}S: for J=1/2$^-$. (2J+1)C^{2}S: 0.12 in 2008KaZT (L=4).
1595 *10*		(2+4)[d]	0.04+0.19	L,(2J+1)C^{2}S: 1974Be54 give L=1 and (2J+1)C^{2}S=0.03.
1660 *10*		3[c]	0.50[c]	L: 1976Sc13 report L=1+4 with (2J+1)C^{2}S=0.02+0.42.
1765?[#] *7*				E(level): not present in spectrum shown by 1976Sc13. Treated as uncertain by evaluators.
1809 *10*		4	1.45	(2J+1)C^{2}S: 0.85 in 2008KaZT.
1903 *5*		0	0.02	
1942 *10*		1	0.10	
2112 *5*		1[c]	0.04	L: 1976Sc13 report L=(1). (2J+1)C^{2}S: 0.032 in 2008KaZT.
2210 *10*		3	0.69	E(level): 1974Be54 report a level at 2252 *10* with L=(3) and S=0.43. It seems to be the same level as 2210 *10* of 1976Sc13.
2240		1	0.044	E(level),L,(2J+1)C^{2}S: from new level in 2008KaZT.
2296 *5*		3[c]	1.36[c]	L: 1976Sc13 report L=1+4 with (2J+1)C^{2}S=0.04+0.81 or L=2+4 with 0.07+0.59.
2385 *10*		1	0.04	(2J+1)C^{2}S: 0.049 in 2008KaZT.
2446[#] *10*		1	0.04	
2485 *10*		1[c]	0.08[c]	L,(2J+1)C^{2}S: 1976Sc13 report L=0+1, (2J+1)C^{2}S=0.01+0.06.
2528 *10*		0+1[d]	0.02+0.16	(2J+1)C^{2}S: 0.12 in 2008KaZT (L=1).
2586 *5*		1+(2)	0.11+0.06	
2680 *10*		0+2	0.03+0.08	
2798 *5*				L: 1976Sc13 report L=1+3 with (2J+1)C^{2}S=0.06+0.96 or L=2+4 with (2J+1)C^{2}S=0.14+0.59.
2920 *5*		0+2	0.01+0.06	
3046 *10*		1	0.06	
3099 *10*		(1)	0.10	E(level): contaminated by contribution from ^{71}As and ^{73}As.
3152 *10*		1,2	0.06,0.06	
3222 *15*		1	0.04	
3308 *10*		1+4[e]	0.09+0.39	
3355 *10*		1+4[e]	0.09+0.39	
3414 *15*		(1+2)[f]	0.06+0.11	
3460 *15*		(1+2)[f]	0.06+0.11	
3565 *15*		(1)		
3608 *10*		(2)		
3716 *10*		(1,2)		
3778 *10*		(1,2)		

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^{74}Ge(^{3}He,d) 1976Sc13,1974Be54,2009Ka06 (continued)

^{75}As Levels (continued)

E(level)[†]	L[†]
3869 *10*	(1,2)
3906 *10*	

[†] From 1976Sc13, unless otherwise stated. The data of 1976Sc13 and 1974Be54 agree well. Levels at 1048, 1942, and E>2700 are reported only by 1976Sc13.
[‡] From 1976Sc13, unless otherwise stated. It is assumed that proton is captured in the orbits s1/2 for L=0, p3/2 for L=1, d5/2 for L=2, f5/2 for L=3 and g9/2 for L=4, unless stated otherwise.
[#] Reported by 1974Be54 only.
[@] From measured polarization asymmetry in (pol d,^{3}He) reaction in 2008KaZT.
[&] 265, 280 and 304 groups are unresolved in 2008KaZT, angle-to-angle ratios of cross sections used to assign separate cross sections.
[a] 1297 and 1309 groups are unresolved in 2008KaZT, angle-to-angle ratios of cross sections used to assign separate cross sections.
[b] L=1+3+4 determined for the 263+279+304 levels. The assignment of the L component to the individual level is based on the known J^{π}.
[c] From 1974Be54.
[d] Mixed L value indicates a doublet.
[e] L=1+4, $(2J+1)C^2S$=0.09+0.39 for the 3308+3355 doublet.
[f] L=(1+2), $(2J+1)C^2S$=0.06+0.11 for the 3414+3460 doublet.