^{72}Ge(^{3}He,d) 1976Sc13,1979Ra08,1974Be54

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 158, 1 (2019)	16-May-2019

1976Sc13: E=23 MeV. Measured $\sigma(\theta)$ (6°−51°), FWHM=14-30 keV. DWBA analysis of $\sigma(\theta)$ data.
1974Be54 (also 1971Be30): E=17 MeV. Measured $\sigma(\theta)$ (4°−86°). FWHM=18-24 keV. DWBA analysis of $\sigma(\theta)$ data.
1979Ra08: E=20 MeV. Measured $\sigma(\theta)$ (6°−58°). FWHM≈20 keV (1979Ra08). DWBA analysis of $\sigma(\theta)$ data.
1980Te01 (also 1978TeZY): E=21 MeV. Measured deuteron spectra at θ=8° and 30°.

^{73}As Levels

Cross section data from 1974Be54

Level	σ(max) mb/sr	Level	σ(max) mb/sr
0	2.60	1982	0.18
67 a	0.77	2040	0.36
85 a	2.22	2137	0.05
253	1.30	2253	0.10
393 b	0.44	2324	0.10
428 b	0.37	2392	0.48
513	0.70	2443	0.36
586	0.03	2562	0.25
776	0.05	2609	0.20
886	0.82	2738	0.14
1080 c	0.17	2831	0.10
1218	0.68	2902	0.17
1323	0.15	3393	0.44
1599	0.13	3561	0.40
1861	0.58		

Uncertainty on level energy: 7 keV up to 2 MeV, 10 keV above.
a: 67+54 form a doublet at 72
b: 393+428 form a doublet at 418
c: doublet.

E(level)[†]	L[a]	$(2J_f+1)C^2S$[a]	Comments
0.0	1	0.92	$(2J_f+1)C^2S$: 1.03 (1979Ra08,1974Be54).
67.5 *7*	3	5.33	$(2J_f+1)C^2S$: 4.9 (1979Ra08), 4.92 (1974Be54).
84.2 *5*	1	0.67	$(2J_f+1)C^2S$: 0.65 (1979Ra08), 0.85 (1974Be54).
253.4 *5*	1	0.47	$(2J_f+1)C^2S$: for $p_{1/2}$. $(2J_f+1)C^2S$: 0.46 (1979Ra08), 0.49 (1974Be54).
393.0 *8*	1	0.17	$(2J_f+1)C^2S$: 0.22 (1979Ra08), 0.16 (1974Be54).
427.4 *5*	4	2.42	$(2J_f+1)C^2S$: 2.12 (1979Ra08), 2.46 (1974Be54).
509.1 *7*	2	0.33	$(2J_f+1)C^2S$: 0.37 (1979Ra08), 0.44 (1974Be54).
578 *2*	3[d]	0.13[d]	
654 *3*			
715[&] *10*			
766 *4*	3[d]	0.22[d]	E(level): 785 (1979Ra08).
846 *4*	*b*	*b*	
856 *4*	*b*	*b*	
880 *4*	0[bd]	0.08[bd]	$(2J_f+1)C^2S$: 0.05 (1979Ra08).
1073[‡] *5*	1+3	0.05,0.18	$(2J_f+1)C^2S$: 0.12 for L=(1) (1979Ra08).
1215[#] *5*	1[d]	0.21[d]	$(2J_f+1)C^2S$: 0.10 (1979Ra08).

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^{72}Ge(^{3}He,d) 1976Sc13,1979Ra08,1974Be54 (continued)

^{73}As Levels (continued)

E(level)[†]	L[a]	$(2J_f+1)C^2S$[a]	Comments
1265[&] *10*			
1304[#] *5*			
1330[‡#] *5*	1+2[c]	0.04,0.04[c]	E(level): 1307 *10* (1976Sc13). $(2J_f+1)C^2S$: 0.08 for L=2 (1974Be54); 0.02, 0.04 for L=1+2, 0.03, 0.17 for L=1+3 (1976Sc13).
1544[#] *5*			
1596[‡#] *5*	1+3	0.03,0.12	$(2J_f+1)C^2S$: 0.02 for L=(0) (1979Ra08), 0.04 for L=1 (1974Be54).
1852 *5*	4	2.48	$(2J_f+1)C^2S$: 1.71 (1979Ra08), 3.05 (1974Be54).
1912[#] *5*			
1971[#] *5*	3[d]	0.91[d]	$(2J_f+1)C^2S$: 0.77 (1979Ra08), 0.84 (1976Sc13) for L=4.
2023[#] *5*	0	0.02	$(2J_f+1)C^2S$: 0.04 (1974Be54).
2096[&] *10*			
2136[#] *5*			
2208[#] *5*	3[c]	0.65[c]	
2239[#] *5*			
2310[#] *5*			
2377[#] *5*			
2394[#] *5*	2[ce]	0.13[ce]	$(2J_f+1)C^2S$: 0.22 (1974Be54).
2437[#] *5*	2[ce]	0.21[ce]	$(2J_f+1)C^2S$: 0.19 (1974Be54).
2461[#] *5*			
2487[#] *5*	(1)	0.03	
2545[#] *5*	2	0.08	
2564[#] *5*			
2606[#] *5*	0	0.02	$(2J_f+1)C^2S$: 0.02 (1974Be54).
2633[#] *5*			
2703[‡#] *5*	0+1	0.02,0.01	$(2J_f+1)C^2S$: 0.05 for L=1 (1979Ra08).
2730[#] *5*			
2744[#] *5*			
2823[‡] *10*	2+4	0.03,0.18	E(level): 2802 *15* (1979Ra08). $(2J_f+1)C^2S$: 0.02 for (0) (1979Ra08).
2903 *10*	2	0.06	$(2J_f+1)C^2S$: 0.08 (1979Ra08), 0.07 (1974Be54).
2931 *15*			
3003 *15*			
3087 *15*			
3157 *15*	0	0.03	
3203 *15*			
3257 *15*	3	0.43	
3392 *15*	(0)[d]	0.09[d]	
3532[‡] *15*	(1+3)	0.03,0.44	E(level): 3561 *10* (1974Be54). $(2J_f+1)C^2S$: 0.09 for L=(1) (1974Be54).
3610 *15*			
3666 *15*			
3724 *15*			
3791 *15*			
3880 *15*			
3994 *15*			
4267 *15*			
4470 *15*			
4518 *15*			

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^{72}Ge(^{3}He,d) 1976Sc13,1979Ra08,1974Be54 (continued)

^{73}As Levels (continued)

E(level)[†]	L[a]	$(2J_f+1)C^2S$[a]	Comments
4600 *15*			
4650 *15*	0	0.03	
4712 *15*	2	0.07	
4780 *15*			
4860 *15*			
4900 *15*	4	3.80	
4952 *15*	2	0.18	
5010 *15*			
5070[‡] *15*	0+2	0.03,0.14	
5190 *15*	2	0.13	
5278 *15*	2	0.13	
8890[@]			E(level): doublet; possible analog of g.s. in ^{73}Ge.
9260[@]			
9310[@]			
9375[@]			
9435[@]			
9510[@]			
9560[@]			
9670[@]			
9755[@]			
9860[@]			
9950[@]			
9990[@]			
10040[@]			
10125[@]			
10190[@]			
10480[@]			
10670[@]			

[†] From 1976Sc13 up to 2903, and from 1979Ra08 for levels above, except as noted.
[‡] Mixed L-transfer indicates a doublet.
[#] From 1980Te01.
[@] From 1979Ra08; possible analog state of ^{73}Ge. However, the energy is ≈80 keV lower than the corresponding IAS reported in ^{72}Ge(p,p′), ^{72}Ge(p,γ).
[&] From 1979Ra08.
[a] From 1976Sc13 for levels up to 2903, and from 1979Ra08 for levels above, unless otherwise stated. The L assignments are based on comparison with DWBA calculation. Following orbitals for the transferred proton are assumed, unless otherwise stated in deducing $(2J_f+1)C^2S$ values: $s_{1/2}$ for L=0; $p_{3/2}$ for L=1; $d_{5/2}$ for L=2, $f_{5/2}$ for L=3; $g_{9/2}$ for L=4.
[b] L=0(+2) with S=0.05, 0.04 for 846+856+880 (1976Sc13).
[c] From 1979Ra08.
[d] From 1974Be54.
[e] L=1+2 with S=0.16, 0.16 for 2394+2437 (1976Sc13).