^{32}S(p,t) 2007Ba69,2010Se07,1972Pa02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia, A. Chakraborty	NDS 197,1 (2024)	31-May-2024

Others: 2009ObZY, (2010Se08, 2010Se22 − conf. pub. of 2010Se07), 2012Al23, 2013Se08.

2007Ba69: Target: ZnS; Projectile: p, E=37 and 39 MeV; charged particles detected using the SIDAR silicon detector array in 18° to 48° and 31° to 75° ranges; deduced level excitation energy, l values from $\sigma(\theta)$ and DWBA analysis. FWHM=80 keV for E_p=37−MeV data and 120 keV for E_p=39−MeV data.

2010Se07,2013Se08: Target: CdS; Projectile: p, E=34.5 MeV; Enge split-pole magnetic spectrograph, position-sensitive ionization drift chamber (ΔE detector), plastic scintillator (E detector); studied at θ_{lab}=10°, 20°, 22°, and 62°(2010Se07) and 27.5°, 45° (2013Se08); measured triton spectra; deduced level energy, J^π, and level scheme. FWHM ≈30 keV.

1972Pa02: Target: Natural H_2S gas with about 95.0% ^{32}S; Projectile: p, E=39.9 MeV; two particle telescopes of ΔEE Si surface-barrier detector; measured triton energy spectra, deduced excited level energies of ^{30}S. FWHM=90 keV.

2009ObZY: ^{32}S target sandwiched between gold foils, projectile: p, E=100 MeV; the Grand Raiden spectrometer at Osaka University, JAPAN and the RCNP detector system, consists of Multi-Wire Drift Chambers and two plastic scintillators; measured triton spectra.

2012Al23: ^{32}S(p,t): proton beam at E=98.7 MeV at the Ring Cyclotron facility of the RCNP at Osaka University. Target: 3.38 mg/cm^2 ^{32}S (≥99%). Measured triton spectra at −0.3° and 8° using Grand-Raiden magnetic spectrometer. Deduced levels, J, π. DWBA analysis. FWHM ≈ 35 keV. Also studied through the ^{28}Si(^{3}He,n) reaction.

^{30}S Levels

E(level)[†]	J$^\pi$[a]	L[†]	Comments
0	0$^+$	0	
2210.7[‡]	2$^+$	2	E(level): others: 2008 *3* (2013Se08), 2239 *18* (1972Pa02), 2208.5 *22* (2012Al23).
3402.6[‡]	2$^+$	2	E(level): others: 3438 *14* (1972Pa02), 3405.8 *12* (2012Al23).
3680[‡] *6*	(1$^+$)		E(level): others: 3681 *3* (2013Se08), 3707 *25* (1972Pa02), 3680 *4* (2010Se07), 3677.3 *70* (2012Al23). J$^\pi$: angular distribution consistent with 1$^+$ and does not agree with 0$^+$. Extremely tentative L=(0) in 1972Pa02, appears to be not acceptable.
4688[@] *2*	3$^+$		E(level): 4682.5 *57* (2012Al23). J$^\pi$: from triton angular distributions and mirror analogue of ^{30}Si (2013Se08).
4704 *5*	(3$^+$)		E(level),J$^\pi$: energy and angular distribution consistent with 3$^+$ assignment; less likely possibility for 2$^+$. Others: 4693 keV *5* (2010Se07 − other value 4692.7 *45* in 2010Se08, 2010Se22). Mirror state of ^{30}Si at 4831 (J^π=3$^+$) (2010Se07).
4814[#@] *3*	(2$^+$)		E(level): others: 4812 *2* (2013Se08), 4813.8 *34* (2010Se08 − other value in 2010Se07, 2010Se22). J$^\pi$: From comparison of the 2^+_3 state location with the prediction by isobaric multiple mass equation (IMME) (2010Se07). Mirror to the ^{30}Si state at 4810 (J^π=2$^+$) (2010Se07).
5136[#]	(4$^+$)		E(level): used as energy calibration point in 2010Se07, 2013Se08. Other: 5130.0 *18* (2012Al23). J$^\pi$: (4$^+$) in 2013Se08 and 4$^+$ in 2012Al23. Earlier from comparison of the location of the 3^+_2 state with the prediction by IMME (2010Se07). E(level): probable mirror state of 5231, 3$^+$ in ^{30}Si.
5168 *6*	(4$^+$)	4+0	E(level): probably an unresolved doublet (2007Ba69). 2010Se07 did not observe this peak, in the absence of further experiment, 2010Se07 assumes this is one level and the other one at 5226 keV *3*. probable mirror state of 5280, 4$^+$ in ^{30}Si.
5226[#] *3*	(0$^+$)		E(level): Others: 5225 *2* (2013Se08), 5207 *22* (1972Pa02), 5217.8 *28* (2012Al23). J$^\pi$: assuming this to be a doublet of 5168(6), tentatively assigned by 2010Se07, consistent with mirror pair of 5372 keV level of ^{30}Si. Also the same assignment in 2013Se08.
5318[#] *4*	3$^-$		E(level): others: 5315 *2* (2013Se08), 5306 *25* (1972Pa02), 5312.1 *20* (2012Al23). J$^\pi$: from prediction of the 3$^-$ state location and considering this as the same 5288 keV (J^π=3$^-$) level reported by 1982Yo02 from ^{28}Si(^{3}He,n)^{30}S(p) experiment (2010Se07). Probable mirror state of 5487, 3$^-$ in ^{30}Si (2010Se07). J^π=(3$^-$,2$^+$) in 2013Se08.
5396[#] *4*	(2$^+$)	3,(2)	E(level): others: 5393 *2* (2013Se08), 5426 *25* (1972Pa02), 5382.0 *7* (2012Al23). E(level),J$^\pi$: from prediction of the 2$^+$ state location (2010Se07). Other: 5383(8) (2007Ba69),

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^{32}S(p,t) 2007Ba69,2010Se07,1972Pa02 (continued)

^{30}S Levels (continued)

E(level)†	Jπa	L†	Comments
			J^π=(3$^-$,2$^+$) (2007Ba69). Probable mirror state of 5614, 2$^+$ in ^{30}Si (2010Se07). J^π=3$^+$ in 2013Se08.
5843 *5*			E(level): others: 5849 *2* (2013Se08), 5835.5 *13* (2012Al23). Jπ: L=2,3,4 are also possible, J^π=(1,2$^+$,4$^+$) in 2013Se08 and 4$^+$ in 2012Al23. (1$^-$) in 2007Ba69 from their L=1 from triton(θ) (≈20° to 60°).
5947?@ *2*			E(level): from 2013Se08. Other: 5897 *27* (1972Pa02). Jπ: (4$^+$) in 2013Se08 list as adopted – no arguments are available.
6071 *11*	(1$^-$)b		E(level): others: 6055 *3* (2013Se08), 6108 *29*? (1972Pa02).
6223? *30*			E(level): from 1972Pa02.
6341 *5*	(0$^+$)b		E(level): others: 6345 *3* (2013Se08), 6325.9 *7* (2012Al23).
6415 *40*			E(level): from 1972Pa02.
6512.1& *33*	(2,3)b		E(level): others: 6536 *3* (2013Se08), 6766 *10* (2007Ba69). Jπ: (1$^-$) (2012Al23), (2,3) in 2013Se08 from triton angular distributions and mirror analog of ^{30}Si.
6768 *3*	2$^+$	2	E(level): from 2013Se08. Others: 6766 *10* (2007Ba69), 6737.5 *17* (2012Al23). Jπ: 2$^{(-)}$ in 2013Se08.
6861 *40*			E(level): from 1972Pa02.
6901.5& *23*	(1$^-$)&		
7058.9& *25*	0$^+$&		E(level): other: 7074 *9* (1972Pa02).
7194.9& *18*	3$^-$&		E(level): other: 7185 *35* (1972Pa02).
7310.6& *7*	(2$^+$)&		
7446.5& *12*	(4$^+$)&		
7899.0& *8*			
8082.8& *23*			
8482.3& *15*			
8875.0& *82*			
9080.6& *45*			
9276.3& *42*			
9391.4& *65*	(0$^+$,1$^-$,2$^+$)&		
9486.0& *74*			
9701.2& *56*	(0$^+$,1$^-$,2$^+$)&		
9785.1& *44*			
9874.2& *91*	(0$^+$,1$^-$,2$^+$)&		
10009& *21*			
10070.5& *55*			
10122.6& *15*			
10274.7& *19*			
10443.1& *46*			
10755.1& *30*			
10814.9& *28*			
11015.4& *8*			
11399.7& *22*			
11490.4& *33*			
11546.2& *20*			
11609.1& *25*			
11681.7& *40*			

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^{32}S(p,t) 2007Ba69,2010Se07,1972Pa02 (continued)

^{30}S Levels (continued)

E(level)[†]
11852.3[&] *37*
12039.2[&] *23*

[†] From 2007Ba69, except otherwise noted.
[‡] Level energy also reported by 2010Se07 and 1972Pa02.
[#] From 2010Se07.
[@] Weak peak in triton spectrum (2013Se08).
[&] From 2012Al23.
[a] From 2007Ba69 based on L values, except otherwise noted.
[b] From triton angular distributions and mirror analog of ^{30}Si (2013Se08).