^{34}S(d,p)   2024Ku24,1984Pi03,1969Mo12

J^{π}=0$^+$ for ^{34}S g.s.

2024Ku24: an 8-MeV/nucleon deuteron beam was produced from the 9-MV Super-FN tandem Van de Graaff accelerator at FSU. The target was carbon-backed sulfur enriched in ^{34}S. Protons were spatially dispersed by the Super-Enge Split-Pole Spectrograph and detected using a position-sensitive ionization chamber (ΔE) and a plastic scintillator (E) at the focal plane with FWHM$\approx$45 keV. An additional ^{34}S(d,pγ)^{35}S measurement using the CeBr^3 Array (CeBrA) demonstrator provides information on some overlapping peaks produced from the ^{32}S contaminants in the target. Measured θ(E$_p$,θ). Deduced 23 levels, single-neutron spectroscopic factors and strengths from finite-range PTOLEMY-DWBA analysis.

1984Pi03: a 12.3-MeV deuteron beam was produced from a cyclotron. The target was CdS (61.9% in ^{36}S, 37.7% in ^{34}S), 100 μg/cm^2 on a 20 μg/cm^2 carbon backing. Protons were analyzed by a multi-angle magnetic spectrograph and detected using a 700-mm long nuclear emulsion plates Ilford L4. Measured σ(E$_p$,θ). Deduced 13 levels, L, J, π, and spectroscopic factors from DWUCK-DWBA analysis for six excited states of ^{35}S.

1971Va18: a 10-MeV deuteron beam was produced from the Utrecht 6-MV tandem accelerator. Targets were a 100 μg/cm^2 PbS on carbon plus formvar foils and a 5 μg/cm^2 pure ^{34}S embedded in aluminum foil. Protons were detected using 15 mm long and seven 30 mm long, 0.6 mm thick position-sensitive detectors (PSD) in the focal plane of the Utrecht split-pole magnetic spectrograph. Measured θ(E$_p$,θ). Deduced 17 levels, L, J, π, spectroscopic factors from DWUCK-DWBA analysis for the ground state and seven excited states of ^{35}S.

1958En51: 6.006- and 6.542-MeV deuteron beams were produced from the MIT-ONR electrostatic generator. Targets were Sb^{2}S^3 of natural isotopic constitution (4.2% ^{34}S). Energies of charged reaction products emitted from the target at angles of 50, 90, and 130° were measured by a broad-range magnetic spectrograph and nuclear emulsions. Measured σ(E$_p$,θ). Deduced 5 levels.

1966Sc09: 9- and 12-MeV deuteron beams were produced from the Argonne tandem accelerator. The target was PbS. Protons were detected using silicon surface barrier detectors. Measured σ(E$_p$,θ) for the ground state and one excited state of ^{35}S.

1969Mo12: a 6.495-MeV deuteron beam was produced from the ONR-CIT tandem accelerator. The target was an enriched target of 450 25-μg/cm^2 CdS (85% ^{34}S) evaporated onto a 301 15-μg/cm^2 gold foil and a natural target of 289 30-μg/cm^2 Sb^{2}S^3 evaporated onto a 289 30-μg/cm^2 gold foil. Protons were detected using an array of 16 Au-Si surface barrier detectors with FWHM=30 keV. Measured θ(E$_p$,θ). Deduced 37 levels.

1971Ko33: a 6.6-MeV deuteron beam was produced from a cyclotron. Targets were GeS films of 70-80 μg/cm^2 (98% enrichment in ^{34}S) evaporated onto a 20 μg/cm^2 carbon substrate. Protons were detected using an 800$-\mu$-thick Si(Li). Measured σ(E$_p$,θ). Deduced levels, J, π, L and spectroscopic factors from distorted-wave analysis for the ground state and five excited states of ^{35}S.

1971Me12: a 18-MeV deuteron beam was produced from the Yale MP tandem Van de Graaff accelerator. The target was H^{2}S gas of natural isotopic composition (95.06% ^{32}S, 4.18% ^{34}S). Protons were detected using a ΔE-E telescope of silicon surface-barrier detectors. Measured σ(E$_p$,θ). Deduced levels, J, π, L and spectroscopic factors local, zero-range JULIE-DWBA analysis of σ(E$_p$,θ) for the ground state and two excited states of ^{35}S.

1979So01: a 3.55-MeV deuteron beam was produced from a Van de Graaff electrostatic generator. The target was 18$-\mu$g/cm^2 GeS (80% ^{36}S, 20% ^{34}S) on a 25$-\mu$g/cm^2 carbon backing. Protons were analyzed by a magnetic spectrograph and recorded by a spark chamber with FWHM=10-15 keV. Measured σ(E$_p$,θ). Deduced levels.

Other measurements: 1976We29: ^{34}S(d,p)^{35}S angular distributions for the ground state and the first excited state of ^{35}S.

     1973Co25:^{34}S(d,p)^{35}S excitation functions for the two lowest excited states of ^{35}S.

Theoretical calculations: 1977Os07, 1974Os02.

^{35}S Levels

E(level)	L$^{\&}$	C^{2}S$^{\&}$	Comments
0	2	0.54 *12*	L: 2 also from 1971Va18, 1971Ko33, and 1971Me12. C^{2}S: 0.43 *11* (1971Va18), 0.33 (1971Ko33), 0.46 (1971Me12).
1571.92$^{\#}$ *19*	0	0.14 *7*	L: 0 also from 1971Va18, 1971Ko33, and 1984Pi03. C^{2}S: 0.17 *4* (1971Va18), 0.25 (1971Ko33), 0.154 (1984Pi03).
1991.08$^{\#}$ *16*	3	0.87 *9*	C^{2}S: 0.91 *23* assuming J^{π}=5/2$^-$, 0.68 *17* assuming J^{π}=7/2$^-$ (1971Va18), 0.38 assuming J^{π}=7/2$^-$ (1971Ko33), 0.63 assuming J^{π}=7/2$^-$ (1971Me12), 0.841 assuming J^{π}=7/2$^-$ (1984Pi03).
2347.59$^{\#}$ *15*	1	0.62 *7*	E(level): Others: 2347 *8* (1969Mo12) and 2336 *10* (1971Va18). L: 1 also from 1971Va18 and 1984Pi03. C^{2}S: 0.52 *13* assuming J^{π}=3/2$^-$ (1971Va18), 0.50 assuming J^{π}=3/2$^-$ (1971Me12), 0.33 assuming J^{π}=3/2$^-$ (1971Ko33), 0.505 assuming J^{π}=3/2$^-$ (1984Pi03).

Continued on next page (footnotes at end of table)

^{34}S(d,p)   2024Ku24,1984Pi03,1969Mo12 (continued)

^{35}S Levels (continued)

E(level)	J^{π}	L[&]	C^{2}S[&]	Comments
2724 *8*		2	0.02 *1*	E(level): weighted average of 2722 *8* (1969Mo12) and 2726 *8* (1971Va18).
				L: Other: (2,3) from 1971Va18.
2941 *10*		2	<0.02	E(level): weighted average of 2943 *10* (1969Mo12) and 2939 *10* (1971Va18).
3420 *8*		2	0.02 *1*	E(level): weighted average of 3422 *8* (1969Mo12) and 3415 *12* (1971Va18).
3569 *14*				E(level): unweighted average of 3583 *8* (1969Mo12) and 3555 *9* (1971Va18).
3596[†] *8*				E(level): Other: 3595 *9* (1971Va18).
3675[‡] *10*		(1)		L: From 1971Va18.
				C^{2}S: <2.5×10^{-3} assuming J^{π}=1/2$^-$ and <1.25×10^{-3} assuming J^{π}=3/2$^-$ (1971Va18).
3801.90[#] *30*		1	0.07 *4*	E(level): Others: 3804 *8* (1969Mo12) and 3795 *10* (1971Va18).
				L: 1 also from 1971Va18.
				C^{2}S: 0.09 *3* assuming J^{π}=3/2$^-$ (1971Va18).
3885[†] *10*				E(level): Other: 3866? *10* (1971Va18).
3907[‡] *10*				
4025 *10*				E(level): weighted average of 4025 *10* (1969Mo12) and 4025 *10* (1971Va18).
4109 *10*				E(level): weighted average of 4112 *10* (1969Mo12) and 4105 *10* (1971Va18).
4189.87[#] *26*		1	0.17 *2*	E(level): Others: 4190 *8* (1969Mo12) and 4196 *12* (1971Va18).
				C^{2}S: 0.12 *3* assuming J^{π}=1/2$^-$ (1971Va18).
4305 *8*				E(level): weighted average of 4302 *8* (1969Mo12) and 4312 *12* (1971Va18).
4481[†] *8*		2,3	0.07 *2*	E(level): Other: 4477 doublet (2024Ku24).
				L: 2,3 doublet (2024Ku24).
				C^{2}S: for L=2 component. Other: 0.05 *2* for L=3 component (2024Ku24).
4575[†] *8*				
4837[†] *8*				
4903.28[#] *16*		1	0.78 *8*	E(level): Other: 4903 *8* (1969Mo12).
				L: 1 also from 1984Pi03.
				C^{2}S: Other: 0.776 assuming J^{π}=1/2$^-$ (1984Pi03).
4963.12[#] *16*		1	0.32 *3*	E(level): Other: 4965 *8* (1969Mo12).
				L: 1 also from 1984Pi03.
				C^{2}S: Other: 0.218 assuming J^{π}=3/2$^-$ (1984Pi03).
5058[†] *8*		3	0.08 *1*	
5126[†] *11*				
5342[†] *8*				
5475?[†] *10*				
5542?[†] *8*				
5740[@] *20*	(5/2$^-$)	3	0.03 *1*	J^{π}: purely speculative (2024Ku24).
5890[@] *20*	(3/2$^+$)	2	0.11 *2*	J^{π}: purely speculative (2024Ku24).
5980[†] *10*				
6078.6[#] *13*		1	0.086	E(level): Other: 6080 *8* (1969Mo12).
				L,C^{2}S: From 1984Pi03. C^{2}S=0.086 assuming J^{π}=1/2$^-$ and 0.042 assuming J^{π}=3/2$^-$.
6292[†] *8*				
6334[†] *8*				
6344[†] *8*				
6446[†] *8*				
6496[†] *8*				
6537.7[#] *14*				
6545.1[#] *13*				E(level): Other: 6543 *8* (1969Mo12).
6584[†] *10*				

^{34}S(d,p)　　2024Ku24,1984Pi03,1969Mo12 (continued)

^{35}S Levels (continued)

E(level)	L$^{\&}$		Comments
6635.2$^{\#}$ *13*	(2,3)		E(level): Others: 6634 *8* (1969Mo12) and 6625 *30* (2024Ku24).
6677† *8*			
6891.3$^{\#}$ *14*	(1,3)		E(level): Others: 6892 *10* (1969Mo12) and 6915 *30* (2024Ku24).
7021 *10*	(2,3)		E(level): weighted average of 7022 *10* (1969Mo12) and 7005 *35* (2024Ku24).
7150$^{@}$ *35*	(0,3)		
7205$^{@}$ *35*	(1,2)		
7482.7$^{\#}$ *13*	(1,2)		E(level): Other: 7495 *40* (2024Ku24).
7570$^{@}$ *40*	(2,3)		
7640$^{@}$ *40*	(2,3)		

† From 1969Mo12.
‡ From 1971Va18.
$^{\#}$ From 1984Pi03.
$^{@}$ From 2024Ku24.
$^{\&}$ From DWBA analysis of the measured $\sigma(\theta)$ in 2024Ku24, unless otherwise noted. 2024Ku24 normalized $\Sigma C^2 S_{L=3}=1$ up to 5.1 MeV. For DWUCK-DWBA, $C^2 S = \sigma(\theta)_{exp}/\sigma(\theta)_{DWBA}/N/(2J_f+1)*(2J_i+1)$, where N is the normalization factor. N=1.58 (1971Me12), N=1.53 (1971Va18), N=1.53 (1984Pi03).

$\gamma(^{35}$S)

E$_{\gamma}$	E$_i$(level)	E$_f$	Comments
1572	1571.92	0	E$_{\gamma}$: From 2024Ku24.
1991	1991.08	0	E$_{\gamma}$: From 2024Ku24.

^{34}S(d,p)　　2024Ku24,1984Pi03,1969Mo12

Level Scheme

$^{35}_{16}$S$_{19}$