## $^{34}$S(p,t) 1976Na07

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Jun Chen | NDS 201,1 (2025) | 31-Oct-2024 |

1976Na07 (also 1975Na10): E=40 MeV proton beams were produced from the Michigan State university cyclotron. Target was 140 $\mu$g/cm$^2$ enriched $^{34}$S (90.0% $^{34}$S) sandwiched between layers of Formvar and carbon foils. Reaction product were momentum-analyzed with an Enge split-pole magnetic spectrograph (FWHM=30 keV) and detected with a combination position sensitive wire counter and plastic scintillator. Measured angular $\sigma(E_t,\theta)$, $\theta_{cm}$=4° to 55°. Deduced levels, J, $\pi$, L-transfers from DWBA analysis.

1970Ha10 (also 1969Ha19): E=45 MeV proton beam was produced from the Berkeley 88-inch cyclotron. Target was a self-supporting cadmium sulfide (67.92% $^{34}$S) with a thickness of about 100 $\mu$g/cm$^2$. Reaction products were detected using two solid state counter telescopes (FWHM≈100 keV). Measured $\sigma(E_t,\theta)$. Deduced levels, J, $\pi$, analog states. Comparisons with DWBA calculations. Simultaneous measurement of (p,t) and (p,$^3$He) reaction on $^{34}$S target to study parentage of nuclear states of the same isospin, in this case $^{32}$S and $^{32}$P.

1979Fr04: E=42 MeV proton was produced from the Princeton university AVF cyclotron. Target was 200 $\mu$g/cm$^2$ $^{34}$S (95% enriched). Reaction products were momentum-analyzed with a Q3D magnetic spectrometer (FWHM=25 keV) and detected with a surface-barrier detector telescope. Measured energy spectrum. Deduced decay modes and branching ratios for 12050, T=2 level. Comparisons with available data.

1970Mc04: E=44 MeV proton beam was from the Berkeley 88-inch cyclotron. Target was self-supporting CsS (37.2% $^{34}$S). Tritons were detected with three telescopes of ΔE-E silicon detectors. Measured energy spectrum. Deduced decay modes and branching ratios for 11980, T=2 level.

Others: 1980An21.

### $^{32}$S Levels

| E(level)[†] | L[‡] | dσ/dΩ(μb/sr)[#] | Comments |
|---|---|---|---|
| 0 | 0 | 2200 | |
| 2230 *5* | 2 | 375 | |
| 3778 *5* | 0 | 88 | |
| 4280 *5* | 2 | 90 | |
| 4459 *5* | 4 | 121 | |
| 4696 *5* | | 4.9 | |
| 5007 *5* | | 62 | |
| 5415 *5* | | 4.0 | |
| 5553 *5* | 2 | 4.6 | |
| 5797 *5* | | 8.8 | |
| 6230 *5* | | 7.5 | |
| 6417 *5* | 4 | 32 | |
| 6584 *5* | | | |
| 6662 *5* | 2 | 12 | |
| 6769 *5* | | | |
| 6851 *5* | (4) | 5.4 | |
| 7000 *5* | | 7.2 | |
| 7116 *5* | 2 | 145 | T=1<br>E(level): other: 7005 (1969Ha19), 7010 (1970Mc04). Analog to 78-keV level of $^{32}$P.<br>Measured dσ/dΩ(p,t)/dσ/dΩ(p,$^3$He)=1.20 *30*, compared to predicted value of 1.8 for T=1 (1969Ha19). |
| 7349 *5* | | | |
| 7415 *5* | | | |
| 7536 *5* | 0 | 160 | |
| 7637 *5* | | | |
| 7702 *5* | | | |
| 7914 *5* | | | |
| 7966 *5* | 4 | 22 | L: $\sigma(\theta)$ fitted well with L=4, which is however inconsistent with L($^3$He,d)=3, which might indicate a different level. |
| 8121 *8* | | | |

Continued on next page (footnotes at end of table)

## $^{34}$S(p,t) 1976Na07 (continued)

### $^{32}$S Levels (continued)

| E(level)[†] | L[‡] | dσ/dΩ(μb/sr)[#] | Comments |
|---|---|---|---|
| 8266 *8* | | | |
| 8336 *8* | 2 | 57 | |
| 8507 *8* | (0) | 11.0 | L: poor fit (1976Na07). |
| 8725 *8* | | 12.0 | |
| 8848 *8* | | | |
| 9025 *8* | | 15.0 | |
| 9196 *8* | 2 | 42 | |
| 9468 *8* | | 5.7 | |
| 9650 *8* | 2 | 14.5 | |
| 9704 *8* | | 9.1 | |
| 9820 *8* | | 18.5 | |
| 9920 *8* | 2 | 29 | |
| 10276 *8* | 4 | 28 | |
| 10370 *8* | 2 | 60 | |
| 10530 *8* | | | |
| 10780 *8* | 2 | 41 | |
| 10823 *8* | 2 | 84 | |
| 12034 *40* | 0 | 0.19 *4* | %p=100 *13*; %α=4 *4* (1979Fr04)<br>T=2<br>E(level): from 1970Ha10, also seen by 1979Fr04. Analog to g.s. of $^{32}$Si and 5071 *40* level of $^{32}$P (1970Ha10). Other: 11980 (1970Mc04).<br>L: observed σ(θ) consistent with L=0 (1970Ha10).<br>Measured dσ/dΩ(p,t)/dσ/dΩ(p,$^{3}$He)=0.66 *6*, compared to predicted value of 0.60 for T=2 (1970Ha10).<br>Others: %p=86 *17*, %α=18 *7* to g.s. and 11 *5* to 1st excited state in $^{28}$Si (1970Mc04). |

[†] From 1976Na07.
[‡] From DWBA analysis of measured σ(θ), with an accuracy estimated to about 20% (1976Na07).
[#] Maximum cross section in σ(θ) (1976Na07).