

$^{45}\text{Sc}(\alpha, p)$  [1979Ba15, 1979GI07](#)

| Type            | Author   | History<br>Citation | Literature Cutoff Date |
|-----------------|----------|---------------------|------------------------|
| Full Evaluation | Jun Chen | NDS 179, 1 (2022)   | 30-Nov-2021            |

$J(^{45}\text{Sc g.s.})=7/2^-$ .

[1979Ba15](#): E=26 MeV  $\alpha$  beam was produced from the tandem accelerator at Niels Bohr Institute (NBI). Target was  $\approx 100 \mu\text{g}/\text{cm}^2$  natural Sc on a carbon backing. Reaction products were momentum-analyzed with the NBI multi-gap spectrograph (FWHM=25-30 keV). Measured  $\sigma(\theta=7.5^\circ \text{ to } 72.5^\circ)$ . Deduced levels, total angular momentum J-transfers,  $\pi$ . Comparisons with available data. Uncertainty in absolute cross sections is about 20%.

[1979GI07](#): E=11, 12, and 13 MeV  $\alpha$  beams were produced from the 7-MV Van de Graaff accelerator of the University of Freiburg. Target was  $100 \mu\text{g}/\text{cm}^2$  self-supporting  $^{45}\text{Sc}$  foil. Protons were detected with an annular surface-barrier Si detector. Measured E(p) in coincidence  $\gamma$  rays in Ge(Li) detectors. Deduced levels. Report levels up to 8323. [1979GI07](#) report data mainly from  $(\alpha, p\gamma)$ .

See details in that dataset.

Other: [1989Ha38](#), [1992Go12](#).

 $^{48}\text{Ti}$  Levels

| E(level) <sup>†</sup> | J $\pi$ | $d\sigma/d\Omega_{\text{max}}(\mu\text{b}/\text{sr})^\dagger$ | Comments                                                      |
|-----------------------|---------|---------------------------------------------------------------|---------------------------------------------------------------|
| 0                     | + @     | 4.8                                                           |                                                               |
| 986 10                | + @     | 10.2                                                          |                                                               |
| 2296 10               | + @     | 16.3                                                          | E(level): other: 2295 ( <a href="#">1979GI07</a> ).           |
| 2421 10               | + @     | 13.0                                                          | E(level): other: 2421 ( <a href="#">1979GI07</a> ).           |
| 2995 10               | (+) @   | 0.5                                                           | E(level): other: 2999 ( <a href="#">1979GI07</a> ).           |
| 3236 <sup>#</sup> 10  | + @     | 20.4                                                          | E(level): other: 3224+3239 ( <a href="#">1979GI07</a> ).      |
| 3329 10               | (+) @   | $\approx 10$                                                  | E(level): other: 3332+3359 ( <a href="#">1979GI07</a> ).      |
| 3361 <sup>#</sup> 10  | (-) &   | 3.0                                                           |                                                               |
| 3507 10               | + @     | 42.0                                                          | E(level): other: 3508 ( <a href="#">1979GI07</a> ).           |
| 3615 10               |         | 0.9                                                           | E(level): other: 3618 ( <a href="#">1979GI07</a> ).           |
| 3733? 10              |         | 0.06                                                          |                                                               |
| 3775 10               |         | 1.4                                                           | E(level): other: 3783 ( <a href="#">1979GI07</a> ).           |
| 3842 10               |         | 0.6                                                           | E(level): other: 3853 ( <a href="#">1979GI07</a> ).           |
| 4050 <sup>#</sup> 10  |         | 4.6                                                           | E(level): other: 4036+4046+4074 ( <a href="#">1979GI07</a> ). |
| 4390 <sup>#</sup> 10  | + @     | 20.0                                                          | E(level): other: 4398+4404+4458 ( <a href="#">1979GI07</a> ). |
| 4570 <sup>#</sup> 10  | - &     | 3.0                                                           | E(level): other: 4564+4583 ( <a href="#">1979GI07</a> ).      |
| 4714 10               | + @     | 5.9                                                           | E(level): other: 4719 ( <a href="#">1979GI07</a> ).           |
| 4791 <sup>#</sup> 10  | - &     | 3.6                                                           | E(level): other: 4795 ( <a href="#">1979GI07</a> ).           |
| 4861 10               |         | 4.7                                                           |                                                               |
| 4927 <sup>#</sup> 10  |         | 7.6                                                           | E(level): other: 4916+4956+4992 ( <a href="#">1979GI07</a> ). |
| 4962 <sup>#</sup> 10  | + @     | 5.7                                                           |                                                               |
| 5142 <sup>#</sup> 10  |         | 23.9                                                          | E(level): other: 5155+5169+5197 ( <a href="#">1979GI07</a> ). |
| 5199? <sup>#</sup> 10 |         | $\approx 2.5$                                                 |                                                               |
| 5309 10               | - &     | 14.8                                                          | E(level): other: 5252+5300+5312 ( <a href="#">1979GI07</a> ). |
| 5378 10               | - &     | 2.4                                                           |                                                               |
| 5497 <sup>#</sup> 10  |         | 8.2                                                           | E(level): other: 5500+5545 ( <a href="#">1979GI07</a> ).      |
| 5521 <sup>#</sup> 10  |         |                                                               |                                                               |
| 5547 <sup>#</sup> 10  |         |                                                               |                                                               |
| 5630 <sup>#</sup> 20  | (+) @   | 6.7                                                           | E(level): other: 5616+5630 ( <a href="#">1979GI07</a> ).      |
| 5770? 20              |         | 0.7                                                           |                                                               |
| 5840 <sup>#</sup> 20  | - &     | 20.9                                                          | E(level): other: 5805 ( <a href="#">1979GI07</a> ).           |
| 5886 <sup>‡</sup>     |         |                                                               |                                                               |

Continued on next page (footnotes at end of table)

$^{45}\text{Sc}(\alpha, \text{p})$  [1979Ba15](#), [1979Gl07](#) (continued) $^{48}\text{Ti}$  Levels (continued)

| <u>E(level)<sup>†</sup></u>     | <u><math>\text{d}\sigma/\text{d}\Omega_{\text{max}}(\mu\text{b}/\text{sr})^{\ddagger}</math></u> | <u>Comments</u>                                                   |
|---------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 5990 <sup>20</sup>              | 11.0                                                                                             | E(level): other: 5874+6034+6039 ( <a href="#">1979Gl07</a> ).     |
| 6050 <sup>#</sup> <sup>20</sup> | 17.0                                                                                             |                                                                   |
| 6102 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 6102+6152+6172 ( <a href="#">1979Gl07</a> ). |
| 6394 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 6394+6400 ( <a href="#">1979Gl07</a> ).      |
| 6493 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 6493+6507+6573 ( <a href="#">1979Gl07</a> ). |
| 6661 <sup>‡</sup>               |                                                                                                  |                                                                   |
| 6711 <sup>‡</sup>               |                                                                                                  |                                                                   |
| 6757 <sup>‡</sup>               |                                                                                                  |                                                                   |
| 6880 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 6880+6906 ( <a href="#">1979Gl07</a> ).      |
| 7040 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 7040+7075+7118 ( <a href="#">1979Gl07</a> ). |
| 7353 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 7353+7374 ( <a href="#">1979Gl07</a> ).      |
| 7427 <sup>‡</sup>               |                                                                                                  |                                                                   |
| 7531 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 7531+7535 ( <a href="#">1979Gl07</a> ).      |
| 7623 <sup>‡</sup>               |                                                                                                  | E(level): unresolved 7623+7656+7668 ( <a href="#">1979Gl07</a> ). |
| 8323 <sup>‡</sup>               |                                                                                                  |                                                                   |

<sup>†</sup> From [1979Ba15](#), unless otherwise noted. Values of proton groups from [1979Gl07](#) are the corresponding excitation energies from their ( $\alpha, \text{p}\gamma$ ) measurement.

<sup>‡</sup> From [1979Gl07](#).

<sup>#</sup> Unresolved multiplet in [1979Ba15](#).

@  $\sigma(\theta)$  similar for these states ([1979Ba15](#)), with total momentum transfer=7/2,  $\Delta\pi=\text{yes}$ . Parentheses are added for uncertain assignments.

&  $\sigma(\theta)$  similar for these states ([1979Ba15](#)), with total momentum transfer=7/2,  $\Delta\pi=\text{no}$ . Parentheses are added for uncertain assignments.