

$^{48}\text{Ca}(\alpha, \text{d})$  [1969Mo18](#), [1994Fi01](#)

| Type            | Author                    | History | Citation          | Literature Cutoff Date |
|-----------------|---------------------------|---------|-------------------|------------------------|
| Full Evaluation | Jun Chen and Balraj Singh |         | NDS 157, 1 (2019) | 15-Apr-2019            |

[1969Mo18](#):  $E\alpha=31$  MeV beam from the MIT cyclotron. Measured  $\sigma(\theta)$  from 15 to 75° with a  $\Delta E$ -E counter telescope (FWHM=125 keV). Deduced levels, J,  $\pi$ , L-transfers from DWBA analysis.

[1994Fi01](#):  $E\alpha\approx 55$  MeV beam from the Bonn isochronous cyclotron. Measured  $\sigma(\theta)$  with a  $\Delta E$ -E Si telescope (FWHM=120 keV). Deduced levels, J,  $\pi$ , L-transfers from DWBA analysis. No candidates for  $(p_{3/2}, g_{9/2})_{6-}$  transitions observed. A total of 11 groups up to 8250 keV shown in spectral figure 3. The  $\sigma(\theta)$  distribution for the strongest group at 4333 keV,  $8^-$  analyzed and compared with DWBA calculations.

 $^{50}\text{Sc}$  Levels

| E(level) <sup>†</sup>           | L <sup>@</sup> | $\sigma(\text{exp})/\sigma(\text{theory})$ <sup>&amp;</sup> | Comments                                                                                                                                                                                                  |
|---------------------------------|----------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.0                             | 4              | 1 <sup>a</sup>                                              |                                                                                                                                                                                                           |
| 260 <sup>‡</sup> <sub>60</sub>  |                | $\leq 1$ <sup>a</sup>                                       |                                                                                                                                                                                                           |
| 310 <sup>#</sup> <sub>30</sub>  | 2              | 1.7 <sup>a</sup>                                            | <a href="#">Additional information 1.</a>                                                                                                                                                                 |
| 750 <sup>#</sup> <sub>30</sub>  | 4              | 2.2 <sup>a</sup>                                            | <a href="#">Additional information 2.</a>                                                                                                                                                                 |
| 1850 <sup>#</sup> <sub>30</sub> | 0              | 1.6                                                         | Neutron orbital= $f_{5/2}$ .<br><a href="#">Additional information 3.</a>                                                                                                                                 |
| 2230 <sup>‡</sup> <sub>60</sub> | (2)            | 1.5 <sup>b</sup>                                            | E(level): 2260 in <a href="#">1994Fi01</a> seems a composite of 2230 and 2330 in <a href="#">1969Mo18</a> .                                                                                               |
| 2330 <sup>‡</sup> <sub>60</sub> | (4)            | 0.63 <sup>b</sup>                                           |                                                                                                                                                                                                           |
| 3090 <sup>‡</sup> <sub>60</sub> |                |                                                             |                                                                                                                                                                                                           |
| 3280 <sup>‡</sup> <sub>60</sub> |                |                                                             |                                                                                                                                                                                                           |
| 3370 <sup>#</sup> <sub>30</sub> |                |                                                             | <a href="#">Additional information 4.</a>                                                                                                                                                                 |
| 3900 <sup>#</sup> <sub>30</sub> |                |                                                             |                                                                                                                                                                                                           |
| 4280 <sup>‡</sup> <sub>60</sub> |                |                                                             | E(level): 4333 in <a href="#">1994Fi01</a> seems a composite of 4280 and 4420 in <a href="#">1969Mo18</a> .<br>$J^\pi$ : <a href="#">1994Fi01</a> propose $8^-$ based on $\sigma(\theta)$ for 4333 group. |
| 4420 <sup>‡</sup> <sub>60</sub> |                |                                                             |                                                                                                                                                                                                           |
| 5320 <sup>#</sup> <sub>30</sub> |                |                                                             | <a href="#">Additional information 5.</a>                                                                                                                                                                 |
| 6040 <sup>#</sup> <sub>30</sub> |                |                                                             | <a href="#">Additional information 6.</a>                                                                                                                                                                 |
| 6160 <sup>‡</sup> <sub>60</sub> |                |                                                             |                                                                                                                                                                                                           |
| 8250 <sup>#</sup> <sub>30</sub> |                |                                                             |                                                                                                                                                                                                           |

<sup>†</sup> From [1994Fi01](#), unless otherwise stated.

<sup>‡</sup> From [1969Mo18](#).

<sup>#</sup> From [1994Fi01](#).

<sup>@</sup> From comparison of  $\sigma(\theta)$  distributions with DWBA calculations ([1969Mo18](#)).

<sup>&</sup> From [1969Mo18](#),  $\sigma(\text{exp})$  at 30°, proton orbital= $f_{7/2}$ .

<sup>a</sup> Neutron orbital= $p_{3/2}$ .

<sup>b</sup> Neutron orbital= $p_{1/2}$ .