

³⁹K(α ,p) 1995Th06

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen [#] and Balraj Singh		NDS 135, 1 (2016)	31-May-2016

$J^\pi(^{39}\text{K g.s.})=3/2^+$.

1995Th06: E=25 MeV alpha beam was produced from the Niels Bohr Institute Tandem Van de Graaff Accelerator. A target of natural KCl enriched to 93.1% and 20 $\mu\text{g}/\text{cm}^2$ in ³⁹K. Reaction products were momentum analyzed in a multigap magnetic spectrograph of the Elbek type and detected in nuclear emulsions, FWHM=30 keV. Measured $\sigma(E_p, \theta)$. Deduced levels, J^π from DWBA analysis.

1971Pe04: E=10 MeV. Measured $\sigma(\theta)$. Hauser-Feshbach calculations.

1955Sc82: E=8.2 MeV. Eight groups reported up to 4100 keV.

[Additional information 1.](#)

 Integrated cross section (mb) (**1971Pe04**)

Energy	cross section
0	4.5 7
1520	14.8 22
1840	2.9 4
2430	11.0 16
2760	19.4 29
3200	18.5 37
3260	18.0 36
3390+3440	14.8 22
3680	9.6 14
3910	3.8 8
4260	4.7 7
4400	9.97 20
4810	
5010	

⁴²Ca Levels

E(level) [†]	J^π [‡]	$d\sigma/d\Omega$ $\mu\text{b}/\text{sr}$ [@]	Comments
0	0 ⁺ <i>g</i>	47	
1524 4	2 ⁺ <i>i</i>	57	
1836 4	0 ⁺ <i>g</i>	27	
2420 4	2 ⁺ <i>i</i>	29	
2753 3	4 ⁺ <i>j</i>	102	Additional information 2.
3188 4	6 ⁺ <i>j</i>	123	
3260 [#] 40			
3446 ^l 4	3 ⁻ <i>d</i>	152	
3680 [#] 40			
3953 ^m 3	4 ⁻ <i>d</i>	339	
4044 5	3 ⁻ <i>a</i>	97	
4101 3	5 ⁻ <i>d</i>	384	
4260 [#] 40			
4425 4	3 ⁻ <i>d</i>	162	

Continued on next page (footnotes at end of table)

$^{39}\text{K}(\alpha, \text{p})$ **1995Th06** (continued) ^{42}Ca Levels (continued)

E(level) [†]	J ^π [‡]	dσ/dΩ μb/sr [@]	E(level) [†]	J ^π [‡]	dσ/dΩ μb/sr [@]
4691 4	3 ^{-d}	132	6096 7	4 ^{+h}	260
4894 ⁿ 3	5 ^{-d}	393	6144 5	6 ⁻ & 7 ^{-f}	641
4960 5	3 ^{-c}	148	6321 7	<i>d</i>	217
5073 5	≤3 ^{-c}	323	6410 7	8 ^{-f}	219 ^{&}
5156 5	3 ^{-d}	131	6549 7	9 ^{-f}	242
5316 5	3 ⁻ , 4 ^{-b}	101	6587 7	<i>k</i>	339
5387 5	1 ⁻ , 2 ⁻ , 3 ^{-c}	419	6737 7	<i>g</i>	174
5488 5	6 ^{-e}	589	6779 7		254 ^{&}
5587 7	3 ^{-d}	70	6931 7	<i>g</i>	190
5618 7	3 ^{-c}	286	6975 7	<i>k</i>	218
5669 7	3 ^{-d}	229	7031 7	<i>j</i>	251 ^{&}
5741 7	7 ^{-f}	287	7103 7	<i>c</i>	206
5791 7	3 ^{-c}	351	7153 7	<i>j</i>	209
5866 7	0 ⁺ , 2 ^{+g}	103	7228 7	<i>c</i>	
5922 7	3 ⁻ , 4 ^{-d}	131	7274 7	<i>g</i>	
6026 5	1 ⁻ to 6 ^{-e}	329			

[†] Uncertainty of 3 to 7 keV assigned (evaluators) based on a general statement by [1995Th06](#).

[‡] From comparisons of experimental $\sigma(\theta)$ data with DWBA calculations with a cluster form factor for a single particle transfer, as stated in comments for individual levels ([1995Th06](#)).

From [1971Pe04](#) only.

@ At 17.5°, unless otherwise stated.

& At 22.5°.

^a For p_{1/2} transfer.

^b For p_{3/2} transfer.

^c For f_{5/2} transfer.

^d For f_{7/2} transfer.

^e For h_{11/2} transfer.

^f For j_{15/2} transfer.

^g For d_{3/2} transfer.

^h For d_{5/2} transfer.

ⁱ For g_{7/2} transfer.

^j For i_{11/2} transfer.

^k For i_{13/2} transfer.

^l 3390+3440 (doublet) in [1971Pe04](#).

^m 3910 ([1971Pe04](#)).

ⁿ 4810 ([1971Pe04](#)).