^{39}K(^{3}He,α) 1972Ro10,1972Fe06,1966Bl04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 152, 1 (2018)	30-Sep-2017

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

1972Ro10 (also thesis by 1973BeYE, 1971Ro07): E=8 MeV ^{3}He beam was produced from the 4-MV Van de Graaff accelerator at Orsay and E=10 and 11 MeV beams from 5.5-MV Van de Graaff at Strasbourg. Targets were IK (natural or 99.97% enriched in ^{39}K). Reaction products were momentum-analyzed with a magnetic spectrograph (FWHM≈80 keV). Measured $\sigma(\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data and shell-model calculations.

1972Fe06 (also thesis by 1971FeZR): E=21.09 MeV ^{3}He beam was produced from the Rutgers-Bell tandem Van de Graaff accelerator. Targets were 300 μg/cm^2 natural (93% in ^{39}K) KI or KCN on a 20 μg/cm^2 backing. Reaction products were momentum-analyzed with a split-pole magnetic spectrograph (FWHM=40 keV) and detected with a proportional counter telescope. Measured $\sigma(\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data and shell-model calculations.

1966Bl04: E=9.0 and 11.0 MeV ^{3}He beams were produced from the 6-MV Van de Graaff of the Universite Laval. Target was 40 μg/cm^2 natural potassium metal on a 40 μg/cm^2 carbon backing. Reaction products were momentum-analyzed with a broad-range magnetic spectrograph ((FWHM=40 keV) and detected with nuclear emulsions. Measured $\sigma(\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data.

1973Ro18: E=8 MeV. Measured $\sigma(\theta)$, deduced optical-model parameters. Deduced s factors for g.s., 2400, 3440 levels.

^{38}K Levels

Spectroscopic factor C^{2}S is defined in the following formula: dσ/dΩ(exp)=N×C^{2}S×dσ/dΩ(DWBA)/(2j+1), where j=1/2 is for the transferred particle and N the normalization factor.

E(level)[†]	L[@]	C^{2}S[&]	Comments
0	2	1.9	C^{2}S: others: 1.8 (1972Fe06), 1.2 *4* (1966Bl04). For J=3, S=10.6 or 9.1 (1973Ro18).
133 *10*	2	0.49	E(level): 130 *30* (1972Ro10), 138 *10* (1972Fe06), 129 *10* (1966Bl04). Analog of g.s. of ^{38}Ar and ^{38}Ca. C^{2}S: others: 0.32 (1972Fe06), 0.31 *14* (1966Bl04).
463 *10*	0+2	0.2,0.29	E(level): 450 *30* (1972Ro10), 466 *10* (1972Fe06), 458 *15* (1966Bl04. C^{2}S: others: 0.19, 0.22 (1972Fe06); <0.06, 0.32 *9* (1966Bl04).
1702 *15*	2(+0)	0.74,<0.08	E(level): 1700 *30* (1972Ro10), 1700 *15* (1972Fe06), 1704 *15* (1966Bl04). C^{2}S: others: 0.56, <0.05 (1972Fe06); 0.51 *13*, <0.08 (1966Bl04).
2401 *10*	2(+0)	1.3,<0.15	E(level): 2400 *30* (1972Ro10), 2400 *10* (1972Fe06), 2405 *15* (1966Bl04). C^{2}S: others: 1.1, 0.27 (1972Fe06); 1.08 *21*, <0.1 (1966Bl04). For J=2, S<0.3 for L=0; 4.4 or 3.1 for L=2 (1973Ro18).
2638 *10*	1+3,1	0.02,0.08	E(level): 2640 *30* (1972Ro10), 2630 *10* (1972Fe06), 2655 *15* (1966Bl04). E(level),L: L=1+3 (1972Fe06); 1 (1972Ro10). L=1 gives J=1$^-$,2$^-$,3$^-$ and L=1+3 gives J=2$^-$; but J=4$^-$,2$^-$ assignment in Adopted Levels. L=1 or 1+3 here is probably contributed partly by 2613, 3$^-$ level. C^{2}S: from 1972Fe06. Other: 0.14 for L=1 (1972Ro10).
2856 *20*	1+3	0.01,0.02	E(level): 2870 *30* (1972Ro10), 2850 *20* (1972Fe06). L,C^{2}S: from 1972Fe06 only.
3422 *10*	0+2	0.55,0.24	E(level): 3440 *30* (1972Ro10), 3420 *10* (1972Fe06). L: according to 1972Fe06, L=0 is dominant. C^{2}S: others: 0.51, 0.07 (1972Fe06). For J=2, S=0.46 or 0.40 for L=0; 0.19 or 0.17 for L=2 (1973Ro18).
3710[‡] *30*			E(level): 3710 *30* (1972Ro10).
3973 *10*	0+2	0.25,0.37	E(level): 4000 *30* (1972Ro10), 3970 *10* (1972Fe06). C^{2}S: other: 0.23, 0.31 (1972Fe06).
4200[‡] *30*			
4360[‡] *30*			

Continued on next page (footnotes at end of table)

^{39}K(^{3}He,α) 1972Ro10,1972Fe06,1966Bl04 (continued)

^{38}K Levels (continued)

E(level)[†]	L[@]	C^2S[&]	Comments
4500[‡] *30*			
4662 *15*	0+2	0.31,0.13	E(level): 4670 *30* (1972Ro10), 4660 *15* (1972Fe06). C^2S: other: 0.21, 0.15 (1972Fe06).
5080[‡#] *30*			
5234 *15*	0+2	0.25,0.25	E(level): 5250 *30* (1972Ro10), 5230 *15* (1972Fe06). L: according to 1972Fe06, L=0 is dominant. C^2S: other: 0.18, 0.0 (1972Fe06).
5440 *10*	2(+0)	0.09,0.02	E(level): 5450 *30* (1972Ro10). L,C^2S: from 1972Fe06 only.
5620[‡#] *30*			
5780[‡] *30*	0+2	0.29,0.12[a]	
5850[‡] *30*	0+2	0.23,0.10[a]	
6380 *10*	2(+0)	0.35,0.07	E(level): 6380 *30* (1972Ro10). L,C^2S: from 1972Fe06 only.
6590 *10*	2(+0)	0.27,0.03	E(level): 6600 *30* (1972Ro10). L,C^2S: from 1972Fe06 only.
7130 *20*	2(+0)	0.23,0.02	E(level),L,C^2S: from 1972Fe06 only.

[†] Weighted average from 1972Ro10, 1972Fe06 and 1966Bl04, unless otherwise noted.
[‡] Reported by 1972Ro10 only.
[#] Possible doublet (1972Ro10).
[@] From 1972Ro10, 1972Fe06 and 1966Bl04, unless otherwise noted.
[&] From 1972Ro10 at E=10 MeV, unless otherwise noted. Values from 1966Bl04 at E=9 MeV are given under comments. Corresponding values at 8 MeV and 11 MeV are also given by 1972Ro10 which are in agreement with those at 10 MeV.
[a] At E=8 MeV (1972Ro10).