^{41}K(^{3}He,t) 2004Fu08,1975Gr14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja, E. A. Mccutchan	NDS 133, 1 (2016)	30-Sep-2015

J^{π}(^{41}K g.s.)=3/2^{+}.

2004Fu08: E(^{3}He)=140 MeV/nucleon from cyclotron at RCNP, Osaka. Tritons were analyzed with a magnetic spectrometer and detected with a multiwire drift-chamber system (FWHM=35 keV). Spectra measured at 0°−0.5°, 0.5°−1.0° and 1.0°−1.5° ranges. Deduced yields for individual peaks. Derived GT strengths. Possible analog states between ^{41}Ca and ^{41}Sc below 6.2 MeV where main part of GT strength are concentrated were made by comparison of the B(GT) values and in the (^{3}He,t) and ^{41}Ti β decay to ^{41}Sc (1997Ho12).

1975Gr14: E(^{3}He)=25 MeV from Argonne National Laboratory FN tandem Van de Graaf accelerator. Reaction products detected with photographic emulsions and position sensitive proportional counter. Measured triton spectrum and $\sigma(\theta)$. Determined L from DWBA analysis (DWUCK code).

1970Sc03: E(^{3}He)=23 MeV from Stanford University FN Tandem Van de Graaff. Detected tritons with E-ΔE telescope detectors (FWHM=60 keV) from 10°- 35°. Measured σ. Strong peaks at g.s., 2020, 2890, 4111, 4360, 4980, 5300 and 5830.

1975Ta05: E(^{3}He)=18 MeV from University of Pennsylvania tandem accelerator. Strong group seen at 5814.

^{41}Ca Levels

E(level)[‡]	J$^{\pi}$[e]	L[†]	B(GT)[c]	Comments
0[#]		3+5[@]		
2012 *5*	3/2^{+}	0	0.031 *3*	E(level): E=2005 *9* with L=2 (1975Gr14). E(level): possible analog state of 2096 level in ^{41}Sc.
2607 *5*	5/2^{+}	0	0.020 *3*	E(level): possible analog state of 2667 level in ^{41}Sc.
2676 *5*	1/2^{+}	(0)	0.003 *1*	E(level): possible analog state of 2719 level in ^{41}Sc.
2884 *5*	7/2^{+}	≥1		E(level): E=2875 *12* with L=2 (1975Gr14). J$^{\pi}$: From 1975Gr14. A preference of 7/2^{+} over 9/2^{+} is shown by the authors (1975Gr14), since S=0 state are expected to be populated more strongly than S=1 states in (^{3}He,t).
3050 *5*	3/2^{+}	0	0.004 *1*	
3400 *5*	1/2^{+}	0	0.067 *6*	E(level): E=3394 *12* with L=2 (1975Gr14). E(level): possible analog state of 3412 level in ^{41}Sc.
3526 *5*	3/2^{+}	0	0.034 *4*	E(level): E=3510 *12* with L=2 (1975Gr14). E(level): possible analog state of 3563 level in ^{41}Sc.
3737 *5*	(3/2,5/2)$^{+}$	0	0.030 *3*	E(level): E=3754 *12* with L=2 (1975Gr14). E(level): possible analog state of 3781 level in ^{41}Sc.
3845 *5*	1/2^{+}	0	0.012 *2*	E(level): E=3874 *10* with L=(3) (1975Gr14). E(level): possible analog state of 3969 level in ^{41}Sc.
3992[#] *10*				
4093 *5*	5/2^{+}	0	0.45 *3*	E(level): E=4098 *8* with L=2 (1975Gr14). E(level): Strongest peak known to have pure GT nature. E(level): possible analog state of 4245 level in ^{41}Sc.
4182 *5*	(3/2,5/2)$^{+}$	0	0.034 *4*	E(level): possible analog state of 4328 level in ^{41}Sc.
4330 *5*		≥1		E(level): E=4335 *9* with L=3 (1975Gr14).
4419 *5*	3/2^{+}	0	0.033 *4*	E(level): E=4426 *8* with L=2 (1975Gr14). E(level): possible analog state of 4502 level in ^{41}Sc.
4550 *5*		0	0.014 *2*	E(level): E=4551 *11* with L=(2) (1975Gr14). E(level): possible analog state of 4644 level in ^{41}Sc.
4727[&] *5*	(3/2)$^{+}$,(5/2)$^{+}$	0	0.220 *17*	E(level): E=4738 *13* with L=2 (1975Gr14). E(level): possible analog state of 4869 level in ^{41}Sc.
4777[&] *5*	(3/2)$^{+}$	0	0.033 *5*	E(level): possible analog state of 4777 level in ^{41}Sc.
4815[&] *5*	5/2^{+}	0	0.149 *12*	E(level): possible analog state of 4929 level in ^{41}Sc.
4966 *5*		0	0.021 *3*	E(level): possible analog state of 5023 level in ^{41}Sc.

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^{41}K(^{3}He,t) 2004Fu08,1975Gr14 (continued)

^{41}Ca Levels (continued)

E(level)‡	Jπe	L†	B(GT)c	Comments
4986# 8		3@		
5097 5	3/2+	0	0.011 2	E(level): E=5090 15 with L=2,3 (1975Gr14). E(level): possible analog state of 5084 level in ^{41}Sc.
5202# 10		5+6@		
5283? 5	5/2+		0.059 17	E(level): E=5295 7 with L=2,3 (1975Gr14). E(level): possible analog state of 5374 level in ^{41}Sc.
5406 5	f	(0)	0.045 10	E(level): E=5417 7 with L=2,3 (1975Gr14).
5480 5	(3/2)+	0	0.079 7	E(level): E=5493 10 with L=(2) (1975Gr14). E(level): possible analog state of 5576 level in ^{41}Sc.
5631# 8		2@		
5652a 5	g	0	0.067 6	
5717a 5	g	0	0.190 15	E(level): E=5715 10 with L=2 (1975Gr14).
5756a 5	(5/2)+	0	0.051 6	E(level): possible analog state of 5885 level in ^{41}Sc.
5814a 5	3/2+	0	0.148 25	E(level): E=5822 10 with L=0 (1975Gr14). E(level): Isobaric analog state (IAS) (2004Fu28). E(level): Analog of ^{41}K g.s. (1975Gr14,1975Ta05). E(level): possible analog state of 5941 level in ^{41}Sc.
5890b 5	g	(0)	0.021 4	
5969b 5	(3/2,5/2)+	0	0.192 15	E(level): E=5963 8 with L=2 (1975Gr14). E(level): possible analog state of 6085 level in ^{41}Sc.
6019b 5		(0)	0.018 4	E(level): possible analog state of 6133 level in ^{41}Sc.
6068# 8				
6326 5		0	0.031 3	E(level): E=6315 9 with L=2,3 (1975Gr14).
6464 5		0	0.030 3	E(level): E=6470 8 with L=2,3 (1975Gr14).
6544 5		≥1		E(level): E=6565 9 with L=2 (1975Gr14).
6596 5		0	0.033 3	
6653 5		≥1		E(level): E=6650 9 with L=2,3 (1975Gr14).
6744 5		≥1		E(level): E=6743 8 with L=2,3 (1975Gr14).
6823 5		≥1		E(level): E=6829 7 with L=2,3 (1975Gr14).
6904 5		0	0.007 1	E(level): E=6905 11 (1975Gr14).
6959 5		≥1	d	
6984 5		0	0.013d 2	E(level): E=6991 9 with L=(2,3) (1975Gr14).
7120# 11		3+5@		
7207# 14		2+3@		
7225 5		0	0.018 2	
7296 5	g	0	0.024 3	
7332 5		0	0.026 3	
7370 20		≥1		
7499 8		2		
7552 5		≥1		E(level): E=7553 8 with L=2 (1975Gr14).
7586 5		≥1		
7614# 8				
7639 5		0	0.006 2	
7720 20		≥1		
7792 5		(0)	0.006 2	
7854 5		0	0.018 3	
7901 5		≥1		
7986 5		0	0.010 4	
8046 7		0	0.002 1	
8144 7		0	0.008 2	
8272 7		(≥1)		
8347 7		≥1		

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^{41}K(^{3}He,t) 2004Fu08,1975Gr14 (continued)

^{41}Ca Levels (continued)

E(level)‡	L†	B(GT)c	E(level)‡	L†	B(GT)c	E(level)‡	L†	B(GT)c
8406 *7*	(0)	0.009 *2*	9183 *7*	≥1		10030 *20*	≥1	
8468 *7*	≥1		9230 *7*	(0)	0.006 *2*	10113 *7*	(0)	0.009 *3*
8515 *7*	≥1		9324 *7*	(≥1)		10161 *7*	(0)	0.013 *3*
8587 *7*	0	0.016 *3*	9400 *20*	≥1		10194 *7*	≥1	
8653 *7*	≥1		9590 *7*	(0)	0.019 *4*	10238 *7*	≥1	
8702 *7*	≥1		9616 *7*	≥1		10286 *7*	0	0.023 *4*
8861 *7*	0	0.011 *3*	9669 *7*	0	0.014 *3*	10339 *7*	≥1	
8926 *7*	0	0.009 *2*	9771 *7*	≥1		10421 *7*	0	0.014 *3*
9013 *7*	0	0.016 *3*	9862 *7*	(0)	0.004 *2*			
9081 *7*	≥1		9928 *7*	≥1				

† Except as noted, deduced from $\sigma(\theta)$ with angle cuts at 0°−0.5°, 0.5°−1.0° and 1.0°−1.5°. The L=0 GT states peak at 0°. The yields at 0° for most states were compared with that for the 4093 state, known as pure L=0, GT state.

‡ From 2004Fu08 except as noted.

From 1975Gr14.

@ From 1975Gr14.

& Cluster of states at E≈ 4.75 MeV that were difficult to identify (2004Fu28).

a Cluster of states at E≈ 5.7 MeV that were difficult to identify (2004Fu28).

b Cluster of states at E≈ 5.95 MeV that were difficult to identify (2004Fu28).

c Gamow-Teller (GT) transition strengths, extracted from cross sections at 0° in 2004Fu28.

d Combined value of 0.013 *2* for 6959+6984.

e From 2004Fu28. For L(^{3}He,t)=0 from $3/2^+$ target and $\Delta J^\pi=1^+$ GT transition, expected $J^\pi=1/2^+,3/2^+,5/2^+$. The authors (2004Fu28) deduced most probable J^π by comparison with GT strengths of the analog states in ^{41}Sc studied in the β decay of ^{41}Ti (1997Ho12 and 1998Li46). The evaluators have added J^π comments in footnotes for cases where they are in disagreement.

f $5/2^+$ given in 2004Fu28 who suggest the possible analog state at ^{41}Sc at 5493 which is in disagreement with the $J^\pi(^{41}\text{Sc})$ of $1/2^+$.

g π=+ from L=0 in 2004Fu28 at E=5.652, 5.717, 5.890, 7.296 MeV are in disagreement with the negative parity of the suggested analog states in ^{41}Sc respectively, at E=5.773, 5.836, 6.036 and 7.296 MeV.