^{40}Ar(α,pγ),^{41}K(t,pγ)　　**1979Be28,1978MeZX**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

Includes ^{4}He(^{40}Ar,pγ) from 1983Ra37.

1979Be28: E=7-17 MeV α beam. Target of 2-5 mg/cm^2 solid natural Ar at 12-17 K on a 250 μm thick Ta backing. Compton-suppressed Ge(Li) detectors for detecting γ-rays. Measured Eγ, $\gamma\gamma$, $\gamma(\theta)$, γ(lin pol). Deduced levels, J, π, T$_{1/2}$ from DSAM.

1978MeZX: E=11.7 MeV α beam. Measured Eγ, Iγ, pγ(t). Deduced levels, T$_{1/2}$ by DSAM.

Others:

1984Ra23 and 1983Ra37: ^{4}He(^{40}Ar,pγ) E=185, 190 MeV ^{40}Ar beam was produced the VICKSI accelerator. Helium gas target. NaI detector. Measured $\gamma(\theta$,H,t). Deduced g factor and T$_{1/2}$, hyperfine interactions.

1980OlZX: E=116-11.9 MeV α beam. Measured $\gamma(\theta)$, $\gamma\gamma$, T$_{1/2}$ by DSAM.

1977Po07: E=10.4 MeV α beam. Argon gas target. Protons were detected by a surface-barrier detector and γ-rays were detected by a 5 cm by 5cm NaI(Tl). Measured γ(t). Deduced T$_{1/2}$.

1976We23: E=15 MeV α beam was produced from the Triangle Universities Nuclear Laboratory (TUNL) FN tandem accelerator facility. Argon gas target. Two 7.6 by 7.6 cm NaI detectors for detecting γ-rays. Measured $\gamma\gamma(\theta$,H,t). Deduced g factor, T$_{1/2}$.

1976De41: E=12.7 MeV. Measured p$\gamma(\theta$,H,t). Deduced g factor, T$_{1/2}$.

1975Bo30: E=11.7 MeV α beam. Pure natural argon gas target. Two surface barrier detectors for detecting scattered α-particles; a 84 cm^3 Ge(Li) detector for detecting γ-rays. Measured $\gamma(\theta)$, p-γ(t), T$_{1/2}$(level).

1964La14: E$\approx$20 MeV α beam was produced from the Copenhagen cyclotron. Pure argon gas target. Protons were detected in a ionization chamber or a proportional counter; γ-rays were detected by a NaI crystal. Measured σ(E$_p$), pγ.

^{43}K Levels

E(level)[†]	J$^{\pi}$[#]	T$_{1/2}$	Comments
0	3/2$^+$		
561.7[@] 4	1/2$^+$	1.4[@] ps +17−7	
738.2 5	7/2$^-$	200 ns 5	T$_{1/2}$: from pγ(t). Weighted average of 202 ns 4 (1983Ra37,1984Ra23), 184 ns 10 (1977Po07), 165 ns 17 (1976De41), 205 ns 10 (1975Bo30,1978MeZX).
975.3[@] 4	3/2$^-$	1.6[@] ps +14−6	
1110.7[@] 4	3/2$^+$	1.0[@] ps 8	
1207.0 4	(5/2,7/2)$^+$	>4.8[&] ps	T$_{1/2}$: >2.1 ps (1978MeZX).
1510.1 4	7/2$^+$	5.7[&] ps 15	T$_{1/2}$: 1.7 ps +11−6 (1978MeZX).
1549.8[@] 5	3/2$^+$,5/2$^+$	0.09[@] ps 6	
1850.0[‡] 6	11/2$^-$	4.6[&] ps 12	
1866.2 4	(1/2,3/2,5/2$^+$)		E(level): from 1978MeZX.
1987?[‡] 1	(9/2)		
2048.4[‡] 5	(9/2)	1.7[&] ps 6	
2177.4[@] 7	5/2$^{(+)}$	<0.07[@] ps	
2343.8[@] 7		0.7[@] ps +14−4	
2509.5[‡] 5	(11/2$^+$)	>5[&] ps	
3115.2[‡] 7	15/2$^-$	3.5[&] ps 7	
3139[‡] 1	(13/2)		

[†] From least-squares fit to Eγ data, assuming Δ(Eγ)=0.5 or 1 keV when not given by the authors.

[‡] From 1979Be28.

[#] From Adopted Levels.

[@] From 1978MeZX. Lifetime from DSAM.

[&] From DSAM (1979Be28).

$^{40}\text{Ar}(\alpha,p\gamma),^{41}\text{K}(t,p\gamma)$ **1979Be28,1978MeZX (continued)**

$\underline{\gamma(^{43}\text{K})}$

A_2, A_4 and polarization coefficients are from 1979Be28.

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
561.7	$1/2^+$	561.6[@]		0	$3/2^+$			
738.2	$7/2^-$	738.4[@]		0	$3/2^+$	M2+E3	−0.13 2	A_2=+0.17 2, A_4=−0.04 2. Pol=−0.23 4.
975.3	$3/2^-$	413.3[@]	8 5	561.7	$1/2^+$			
		975.4[@]	92 5	0	$3/2^+$			
1110.7	$3/2^+$	549.1[@]	40 10	561.7	$1/2^+$			
		1110.5[@]	60 10	0	$3/2^+$			
1207.0	$(5/2,7/2)^+$	1206.9 5		0	$3/2^+$			
1510.1	$7/2^+$	303.1 2	7 4	1207.0	$(5/2,7/2)^+$			
		1509.9 6	93 4	0	$3/2^+$	E2		A_2=+0.29 2, A_4=−0.07 2. Pol=+0.53 16.
1549.8	$3/2^+,5/2^+$	1549.8[@]		0	$3/2^+$			
1850.0	$11/2^-$	1111.8 4		738.2	$7/2^-$	E2		A_2=+0.35 2, A_4=−0.21 3. Pol=+0.47 6. Additional information 1.
1866.2	$(1/2,3/2,5/2^+)$	890.6[@]		975.3	$3/2^-$			
		1866.4[@]		0	$3/2^+$			
1987?	$(9/2)$	477[&]		1510.1	$7/2^+$			
2048.4	$(9/2)$	1310.4 6		738.2	$7/2^-$			
2177.4	$5/2^{(+)}$	1439.1[@]		738.2	$7/2^-$			
2343.8		477.6[@]		1866.2	$(1/2,3/2,5/2^+)$			
2509.5	$(11/2^+)$	461.1 2		2048.4	$(9/2)$			
		999.3 3		1510.1	$7/2^+$			
3115.2	$15/2^-$	1265.1 4		1850.0	$11/2^-$	E2		A_2=+0.46 2, A_4=−0.19 2. Pol=+0.88 20.
3139	$(13/2)$	1289		1850.0	$11/2^-$			

[†] From 1979Be28, unless otherwise stated.
[‡] From 1978MeZX.
[#] From $\gamma(\theta)$ and γ(lin pol) (1979Be28).
[@] From 1978MeZX.
[&] Placement of transition in the level scheme is uncertain.

${}^{40}Ar(\alpha,p\gamma),{}^{41}K(t,p\gamma)$ **1979Be28,1978MeZX**

Legend

Level Scheme

Intensities: % photon branching from each level

$- - - - - - \blacktriangleright$ γ Decay (Uncertain)

(13/2)	3139	
15/2$^-$	3115.2	3.5 ps 7
(11/2$^+$)	2509.5	>5 ps
	2343.8	0.7 ps +14−4
5/2$^{(+)}$	2177.4	<0.07 ps
(9/2)	2048.4	1.7 ps 6
(9/2)	1987	
(1/2,3/2,5/2$^+$)	1866.2	
11/2$^-$	1850.0	4.6 ps 12
3/2$^+$,5/2$^+$	1549.8	0.09 ps 6
7/2$^+$	1510.1	5.7 ps 15
(5/2,7/2)$^+$	1207.0	>4.8 ps
3/2$^+$	1110.7	1.0 ps 8
3/2$^-$	975.3	1.6 ps +14−6
7/2$^-$	738.2	200 ns 5
1/2$^+$	561.7	1.4 ps +17−7
3/2$^+$	0	

Transition labels: 1289, 1265.1 E2, 999.3, 461.1, 477.6, 1439.1, 1310.4, 477, 1866.4, 890.6, 1111.8 E2, 1549.8, 1509.9 E2 93, 303.1 7, 1206.9, 1110.5 60, 549.1 40, 975.4 92, 413.3 8, 738.4 M2+E3, 561.6

${}^{43}_{19}K_{24}$