^{38}Ar(α,pγ) 1976Li17,1978Li12

History

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

1976Li17 (also 1977Li22): E(α)=7.5-14.5 MeV. Measured Eγ, Iγ, excitation function, $\gamma\gamma$ using two GeLi detectors; deduced lifetimes by Doppler Shift Attenuation Method (DSAM). 1977Li22 report remeasurement of the lifetime of the 980 level, which is consistent with their result from 1976Li17.

1978Li12 (from the same group as 1976Li17): E(α)=9.5 and 10.75 MeV. Measured Eγ, Iγ, $\gamma(\theta)$ using an escape-suppressed Ge(Li) detector and γ(lin pol) using a three-Ge(Li) Compton-polarimeter.

^{41}K Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	3/2$^+$		
980.6 *2*	1/2$^+$	3.5 ps *10*	
1293.8 *2*	7/2$^-$	>3.1 ps	
1560.5 *2*	3/2$^+$	0.42 ps *10*	
1582.3 *2*	3/2$^-$	>3.1 ps	
1593.7 *2*	1/2,3/2	97 fs *35*	J$^\pi$: Adopted J^π=1/2$^+$.
1677.6 *2*	7/2$^+$	1.6 ps *4*	
1697.8 *2*	5/2$^+$	0.83 ps *21*	
2143.5 *2*	3/2$^+$,5/2$^+$	76 fs *21*	J$^\pi$: Adopted J^π=5/2$^+$.
2166.4 *2*	3/2	1.7 ps *6*	J$^\pi$: Adopted J^π=3/2$^-$.
2317.2 *2*	5/2$^-$	0.54 ps *15*	
2495.0 *2*	9/2$^+$	>3.1 ps	
2508.1 *2*	7/2$^+$	0.16 ps *6*	
2528.0 *3*	11/2$^+$	>3.1 ps	
2713.1 *3*	3/2$^-$,7/2$^-$	0.52 ps *15*	J$^\pi$: Adopted J^π=(7/2)$^-$.
2756.5 *5*	3/2$^+$,5/2$^+$	<69 fs	J$^\pi$: Adopted J^π=5/2$^+$.
2760.8 *4*	11/2$^-$	0.46 ps *12*	
2774.1 *3*	13/2$^+$	>3.1 ps	
3142.9 *5*	5/2$^-$,9/2$^-$	0.16 ps *6*	J$^\pi$: Adopted J^π=5/2$^-$.
3235.2 *4*			
3897.2 *5*		0.31 ps *8*	
4276.2 *5*		0.10 ps *6*	
4984.7 *5*		>3.1 ps	

† From a least-squares fit to Eγ.

‡ From 1976Li17 and 1978Li12 based on $\gamma(\theta$,pol) data. Differences with the Adopted J^π values are indicated in the comments.

From DSAM (1976Li17). Results include 25% uncertainty added in quadrature to account for uncertainty in stopping powers.

γ(^{41}K)

A_2, A_4 and POL are from 1978Li12.

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[@]	δ[@]	Comments
980.6	1/2$^+$	980.6 *2*	100	0.0	3/2$^+$			A_2=0.00 *1*, A_4=0.00 *1*, POL=−0.02 *2*.
1293.8	7/2$^-$	1293.8 *3*	100	0.0	3/2$^+$	M2+E3	+0.03 *+1−2*	A_2=+0.38 *1*, A_4=−0.06 *1*, POL=−0.57 *3*.
1560.5	3/2$^+$	579.8 *2*	17.6 *6*	980.6	1/2$^+$	M1+E2	+0.12 *4*	A_2=−0.19 *8*, A_4=0.00 *9*.
		1560.4 *3*	82.4 *6*	0.0	3/2$^+$	M1+E2	−0.27 *2*	A_2=+0.02 *1*, A_4=+0.02 *2*, POL=+0.53 *5*.
1582.3	3/2$^-$	601.6 *2*	15.8 *7*	980.6	1/2$^+$	E1+M2	−0.06 *+9−3*	A_2=−0.42 *4*, A_4=0.00 *4*.
		1582.4 *3*	84.2 *7*	0.0	3/2$^+$	E1+M2	−0.08 *2*	A_2=+0.17 *1*, A_4=+0.01 *1*, POL=−0.45 *6*.
1593.7	1/2,3/2	613.2 *2*	39.5 *11*	980.6	1/2$^+$			

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^{38}Ar(α,pγ) 1976Li17,1978Li12 (continued)

γ(^{41}K) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[‡]	E$_f$	J$^\pi_f$	Mult.[@]	δ[@]	Comments
1593.7	1/2,3/2	1593.4 *4*	60.5 *11*	0.0	3/2$^+$			A$_2$=+0.09 *6*, A$_4$=+0.01 *8*, POL=−0.15 *17*.
1677.6	7/2$^+$	1677.4 *3*	100	0.0	3/2$^+$	E2		A$_2$=+0.42 *1*, A$_4$=−0.19 *2*, POL=+0.77 *4*.
1697.8	5/2$^+$	1697.8 *3*	100	0.0	3/2$^+$	M1+E2	−2.1 *2*	A$_2$=+0.66 *1*, A$_4$=+0.20 *1*, POL=−0.05 *6*.
2143.5	3/2$^+$,5/2$^+$	583.1 *2*		1560.5	3/2$^+$			
		1162.8[#] *3*	<4	980.6	1/2$^+$			I$_\gamma$: <4 *1* (1978Li12).
		2143.6 *5*	<96	0.0	3/2$^+$	M1+E2		I$_\gamma$: <96 *1* (1978Li12). δ: +0.31 *+16−30* for J(2143)=3/2, −0.15 *6* for J(2143)=5/2. A$_2$=−0.60 *11*, A$_4$=−0.13 *13*, POL=−0.42 *15*.
2166.4	3/2	584.1 *2*		1582.3	3/2$^-$			
		1185.9 *3*		980.6	1/2$^+$	D+Q		δ(E2/M1)=−1.3 *3* for J^π(2166)=3/2$^+$. δ(M2/E1)=−0.14 *+9−18* for J^π(2166)=3/2$^-$. A$_2$=−0.50 *4*, A$_4$=+0.06 *5*, POL=+0.40 *2*.
2317.2	5/2$^-$	735.0[#] *2*	6.0 *3*	1582.3	3/2$^-$	D+Q	−0.14 *7*	A$_2$=+0.09 *5*, A$_4$=−0.15 *7*.
		1023.2 *2*	94.0 *3*	1293.8	7/2$^-$	M1+E2	−0.08 *1*	A$_2$=−0.03 *1*, A$_4$=+0.04 *1*, POL=−0.09 *7*.
2495.0	9/2$^+$	797.3[#] *2*	19.1 *10*	1697.8	5/2$^+$	Q		A$_2$=+0.40 *3*, A$_4$=−0.20 *4*.
		817.3 *2*	48.4 *14*	1677.6	7/2$^+$	M1+E2	+0.38 *2*	A$_2$=+0.36 *2*, A$_4$=+0.04 *2*, POL=−0.80 *6*.
		1201.3 *3*	32.5 *11*	1293.8	7/2$^-$	E1+M2	+0.06 *2*	A$_2$=−0.19 *3*, A$_4$=0.00 *3*, POL=+0.47 *10*.
2508.1	7/2$^+$	830.5 *2*	46.8 *14*	1677.6	7/2$^+$	D+Q	+0.36 *+27−35*	A$_2$=+0.53 *4*, A$_4$=−0.04 *4*.
		947.5[#] *2*	4.6 *5*	1560.5	3/2$^+$	Q		A$_2$=+0.36 *8*, A$_4$=+0.03 *9*.
		2508.7 *6*	48.8 *15*	0.0	3/2$^+$	E2		A$_2$=+0.43 *4*, A$_4$=−0.01 *6*, POL=−0.30 *4*.
2528.0	11/2$^+$	850.4 *2*	100	1677.6	7/2$^+$	E2		A$_2$=+0.34 *2*, A$_4$=−0.16 *2*, POL=+0.70 *5*.
2713.1	3/2$^-$,7/2$^-$	395.8 *2*	13.0 *5*	2317.2	5/2$^-$	M1+E2		δ: +0.15 *8* for J(2713)=7/2. A$_2$=+0.01 *7*, A$_4$=−0.01 *7*, POL=−0.35 *21*.
		1419.4 *4*	87.0 *5*	1293.8	7/2$^-$	M1(+E2)		δ: −0.37 *50* for J(2713)=7/2. A$_2$=+0.11 *4*, A$_4$=+0.02 *5*, POL=+1.3 *7*.
2756.5	3/2$^+$,5/2$^+$	2756.4 *5*	100	0.0	3/2$^+$	M1+E2		δ: +(25 to 55) for J(2756)=3/2, -(15 to 50) for J(2756)=5/2. A$_2$=−0.70 *8*, A$_4$=−0.16 *9*, POL=+0.9 *5*.
2760.8	11/2$^-$	1466.9 *3*	100	1293.8	7/2$^-$	E2		A$_2$=+0.42 *2*, A$_4$=−0.23 *2*, POL=+0.73 *6*.
2774.1	13/2$^+$	246.1 *1*	100	2528.0	11/2$^+$	M1(+E2)	+0.04 *4*	A$_2$=−0.26 *1*, A$_4$=+0.03 *1*, POL=−0.45 *4*.
3142.9	5/2$^-$,9/2$^-$	1849.0 *4*	100	1293.8	7/2$^-$	M1+E2		δ: +0.87 *35* for J(3143)=5/2, −0.31 *3* for J(3143)=9/2. A$_2$=−0.75 *3*, A$_4$=−0.02 *2*, POL=−0.39 *12*.
3235.2		918.0[#] *3*		2317.2	5/2$^-$			
		1941.2 *14*		1293.8	7/2$^-$			
3897.2		1123.1 *3*	100	2774.1	13/2$^+$			

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^{38}Ar(α,pγ) 1976Li17,1978Li12 (continued)

γ(^{41}K) (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[‡]	E_f	J^{π}_f
4276.2		1515.4 *3*	100	2760.8	11/2$^-$
4984.7		708.5 *2*	100	4276.2	

[†] From 1976Li17, except where noted.
[‡] From 1978Li12, author's provide only relative branching ratios from individual levels.
[#] From 1978Li12.
[@] From $\gamma(\theta$,pol) data in 1978Li12.

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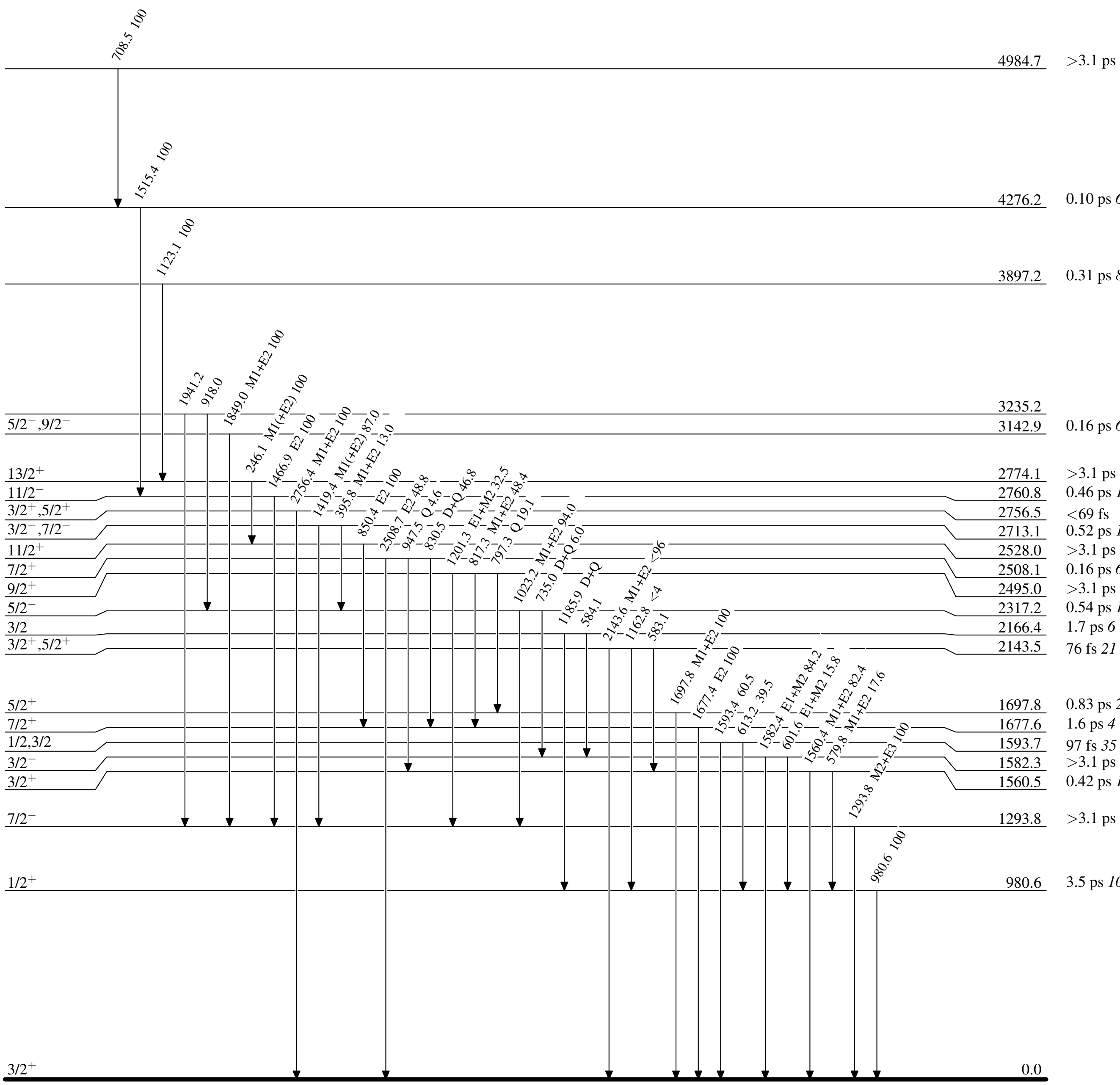
Level Scheme

Intensities: % photon branching from each level



$^{41}_{19}K_{22}$