^{40}Ar(t,pγ) 1974Fi01,1973Pr10

History

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

1974Fi01: E=2.8 MeV triton beam was produced from the Lockheed 3-MV Van de Graaff accelerator. A solid target of natural argon at a temperature of 15 K. Protons were detected in an annular silicon surface barrier detector and γ-rays by a 20-cm^3 Ge(Li) detector at 30′ and 120′. Measured proton spectrum, Eγ, Iγ. Deduced levels, γ branching ratios, $T_{1/2}$ by DSAM.

1973Pr10: E=2.9 MeV beam from the Lockheed Van de Graaff accelerator. Target of a gas cell of natural argon 6.3 mm thick. Protons were detected by silicon annular detector (FWHM=120 keV) and γ-rays were detected by five NaI(Tl) detectors at 5°, 35°, 45°, 60° and 90° with respect to the beam axis and a 20 cm^3 Ge(Li) detector. Measured Eγ, Iγ, p$\gamma(\theta)$. Deduced levels, J^π, mixing ratios, branching ratios.

Other: 1973BaXX.

^{42}Ar Levels

E(level)[†]	J$^\pi$[@&]	$T_{1/2}$[#]	Comments
0	0^+		
1208.22 *13*	2^+	2.6 ps *+7−6*	
2415.2[‡] *10*	(4^+)		Measured upper limit of branching is <10% for transition to g.s. (1973Pr10).
2486.8 *4*	2^+	0.28 ps *11*	
2512.5 *4*	$(0^+$ to $4^+)$	2.8 ps *+21−8*	Measured upper limit of branching is <10% for transition to g.s. (1973Pr10).
3014.6 *4*	$(1,2^+)$	<83 fs	
3096.5 *5*	4^+	>3.5 ps	Measured upper limit of branching is <5% for transition to g.s. (1973Pr10).
3557.9 *3*	2^+	<62 fs	
4006.3 *4*	2^+	0.23 ps *6*	
4127.5 *5*	$(0^+,1,2)$	0.97 ps *21*	Measured upper limit of branching is <5% for transition to g.s. (1973Pr10).
4287.1 *5*	(1,2,3)	<35 fs	
4633.9 *6*	(3^-)	<35 fs	

[†] From least-squares fit to Eγ data.
[‡] From 1973Pr10.
[#] From DSAM (1974Fi01).
[@] From Adopted Levels, unless otherwise noted.
[&] $J^\pi=0^+,1,2,3,4^+$ from γ to 2^+ and RUL.

$\gamma(^{42}$Ar)

Values of A_2 and A_4 are from 1973Pr10.

E$_i$(level)	J$_i^\pi$	E$_\gamma$[†]	I$_\gamma$	E$_f$	J$_f^\pi$	Mult.[&]	Comments
1208.22	2^+	1208.20 *13*	100	0	0^+	E2	A_2=+0.64 *6*; A_4=−1.56 *6*
2415.2	(4^+)	1207[‡]	>90[‡]	1208.22	2^+		
2486.8	2^+	1278.5 *5*	82[@] *5*	1208.22	2^+		A_2=+0.39 *11*
		2486.7 *6*	18[@] *5*	0	0^+	E2	A_2=+0.45 *29*; A_4=−1.3 *3*
2512.5	$(0^+$ to $4^+)$	1304.3 *3*	100[#]	1208.22	2^+		A_2=+0.10 *8*.
3014.6	$(1,2^+)$	1806.4 *4*	62[#] *4*	1208.22	2^+		A_2=+0.53 *9*; A_4=−0.21 *10* I$_\gamma$: other: 92 *4* (1973Pr10). δ: −0.40 *45* or ∞ for J(3015)=1, −0.12 *11* for J(3015)=2 (1973Pr10). (3012p)(1208γ)(θ): A_2=+0.54 *13*, A_4=+0.10 *12* (1973Pr10).

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^{40}Ar(t,pγ) 1974Fi01,1973Pr10 (continued)

$\gamma(^{42}Ar)$ (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ	E_f	J_f^π	Mult.[&]	δ[&]	Comments
3014.6	(1,2$^+$)	3014.6 *8*	38[#] *4*	0	0$^+$			I_γ: other: 8 *4* (1973Pr10).
3096.5	4$^+$	1888.2 *4*	100[#]	1208.22	2$^+$	E2(+M3)	+0.07 *8*	A_2=+0.87 *10*; A_4=−0.45 *10* (3092p)(1208γ)(θ): A_2=−0.53 *5*, A_4=−0.45 *6* (1973Pr10).
3557.9	2$^+$	2349.6 *3*	90[@] *2*	1208.22	2$^+$	D(+Q)	0.00 *7*	A_2=+0.47 *2*; A_4=−0.07 *2* (3558p)(1208γ)(θ): A_2=+0.33 *12*, A_4=+0.65 *15* (1973Pr10).
		3558	10[@] *2*	0	0$^+$			
4006.3	2$^+$	992[‡]		3014.6	(1,2$^+$)			
		1519.40 *22*		2486.8	2$^+$			
		2798[‡]		1208.22	2$^+$			
4127.5	(0$^+$,1,2)	2919.2 *4*	100[#]	1208.22	2$^+$			A_2=+0.17 *14*; A_4=−0.17 *17* δ: −0.3 *2* or +5.6 *30* for J(4127)=2 (1973Pr10). (4127p)(1208γ)(θ): A_2=+0.12 *16*, A_4=−0.08 *19* (1973Pr10).
4287.1	(1,2,3)	3078.8 *4*		1208.22	2$^+$			A_2=+0.26 *4*; A_4=−0.07 *5* δ: −0.04 *8* or +3.1 *10* for J(4287)=2; +0.30 *15* for J(4287)=3 (1973Pr10).
4633.9	(3$^-$)	3425.5 *5*		1208.22	2$^+$	D		A_2=−0.34 *12*; A_4=+0.10 *13*

[†] From 1974Fi01, unless otherwise stated.
[‡] From 1973Pr10.
[#] From 1974Fi01.
[@] Weighted average of 1974Fi01 and 1973Pr10.
[&] From p$\gamma(\theta)$ data of 1973Pr10.

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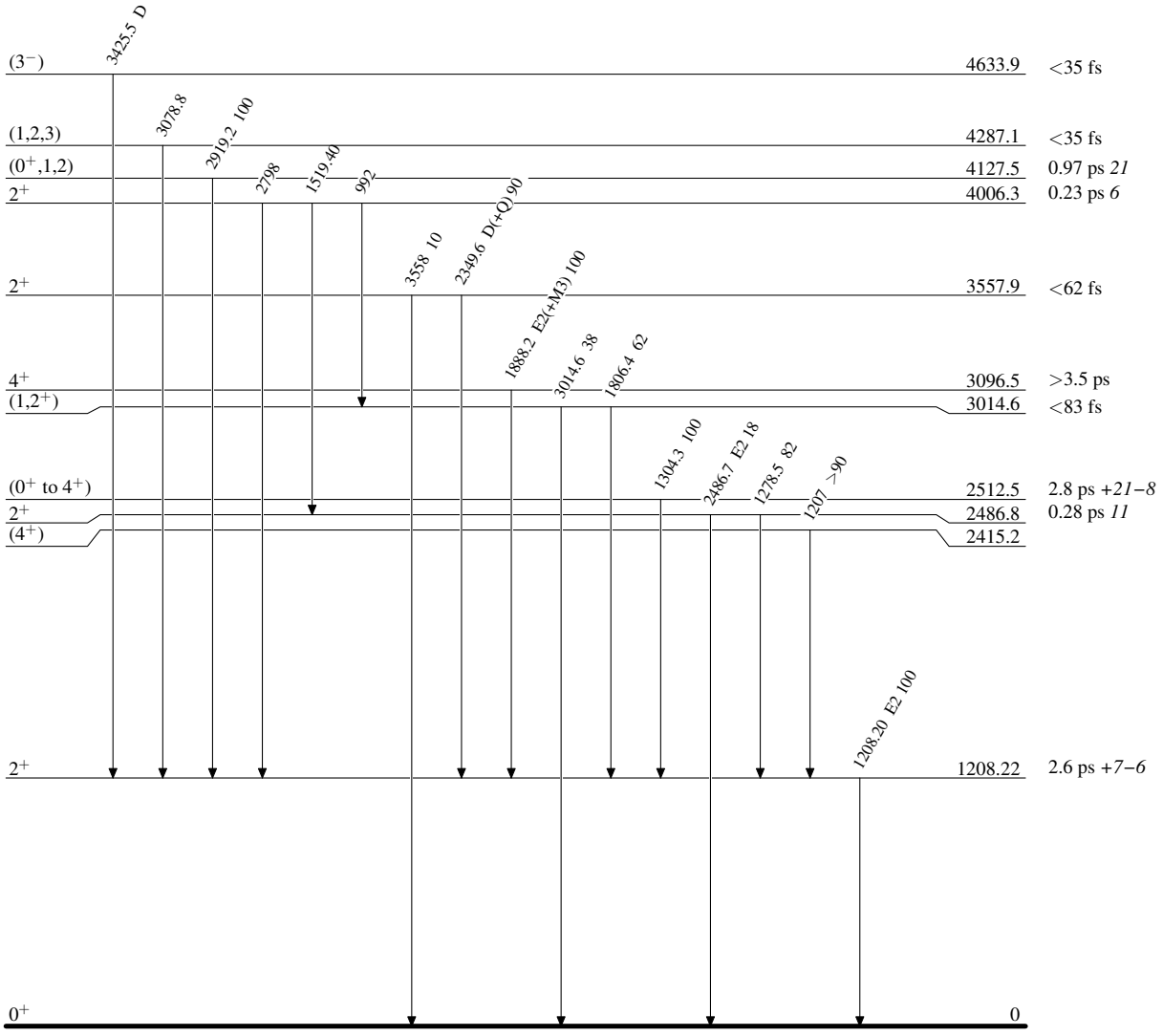
Level Scheme

Intensities: % photon branching from each level



$^{42}_{18}Ar_{24}$