

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Ninel Nica, Balraj Singh		NDS 113,1563 (2012)	28-May-2012

$Q(\beta^-) = -1.72 \times 10^4$ syst; $S(n) = 17065.3$ 4; $S(p) = 4663.9$ 4; $Q(\alpha) = -6744.2$ 4 [2012Wa38](#)
 Note: Current evaluation has used the following Q record -17157 syst 17064.4 5 4663.1 6 -6740 3 [2011AuZZ](#).
 $\Delta Q(\beta^-) = 298$ ([2011AuZZ](#)).
 $Q(\epsilon p) = 919.5$ 3, $S(2n) = 32319.7$ 18, $S(2p) = 6939.8$ 3 ([2011AuZZ](#)).
 Values in [2003Au03](#): $Q(\beta^-) = 16900$ 300 (syst), $S(n) = 17064.4$ 5, $S(p) = 4662.8$ 6, $Q(\alpha) = -6740$ 3, $Q(\epsilon p) = 919.8$ 4, $S(2n) = 32319.6$ 18, $S(2p) = 6939.5$ 4.
 Identification and production of ³⁴Ar isotope: [1966Mi11](#) and [1967Ba36](#) in ³²S + ³He reaction; measured half-life.
³⁴S(π^+, π^-): [1993Bi10](#), [1991Bi07](#) (E=50 MeV), [1987Zu03](#) (E=292 MeV), measured σ .
[Additional information 1](#).
 Mass measurement: [2002He23](#) (also [2001He29](#), [2001He37](#)).
 Nuclear radius measurement: [2002Oz03](#).
 Structure calculations: [2006Or01](#) (levels, B(E2), shell model); [2005Ob01](#) (deformation, levels).
[2007DoZV](#): found 1197 γ and 2090 γ (with two-step fragmentation reaction at relativistic energies) ⁹Be(³⁷Ca, X γ) E=197.5 A MeV reaction).
[2011Le01](#), [2010Le03](#): experimental (by two methods) and theoretical neutron spectroscopic factors and reduction factors for ³⁴Ar g.s. extracted from reaction p(³⁴Ar, d), E(³⁴Ar)=33 MeV/nucleon.

³⁴Ar Levels

Cross Reference (XREF) Flags

A	³⁵ Ca ϵp decay (25.7 ms)	D	³² S(³ He, n)
B	¹ H(³⁴ Ar, p')	E	³⁶ Ar(p, t)
C	³ He(³² S, n γ), ³² S(³ He, n γ)		

E(level)	J ^{π}	T _{1/2} [†]	XREF	Comments
0	0 ⁺	843.8 ms 4	ABCDE	$\% \epsilon + \% \beta^+ = 100$ $\langle r^2 \rangle^{1/2} = 3.365$ fm 4 (2004An04 evaluation and its 2008 update on webpage: http://cdfc.sinp.msu.ru). $\delta \langle r^2 \rangle \langle r^2 \rangle \langle ^{38}\text{Ar}, ^{34}\text{Ar} \rangle = -0.251$ fm ² 6 62, first is statistical and the second is systematic uncertainty (1996KI04 , 2000Ge20). T _{1/2} : from 2006Ia05 , half-life measured and analyzed using parent-daughter (³⁴ Ar to ³⁴ Cl decay) composite decay and a new fitting procedure, gas-ionization chamber used as detection system. Beam of pure ³⁴ Ar ions was produced in ¹ H(³⁵ Cl, 2n) reaction. Others: 844.5 ms 34 (1974Ha26 , also 1972Ha58), 0.85 s 10 (1967Ba36), 1.2 s 3 (1966Mi11). Additional information 2 . $\beta_2(p, p') = 0.27$ 2 (2001Kh17). J^π : L(p, t) = L(p, p') = 2. T _{1/2} : 2001Ra27 evaluation lists 305 fs 49 which is close to the value given here from 1985Al18 . It seems a somewhat different averaging procedure is used in 2001Ra27 .
2091.1 3	2 ⁺	319 fs 42	ABCDE	
3287.7 5	2 ⁺	194 fs 35	A CDE	J^π : L(p, t) = 2.
3873 3	0 ⁺	>187 fs	A CDE	J^π : L(p, t) = 0.
4050 14			DE	
4127.8 10		<208 fs	CD	
4513.2 8	3 ⁻	201 fs 38	BCDE	$\beta_3(p, p') = 0.39$ 3 (2001Kh17). J^π : L(p, p') = L(³ He, n) = 3.
4631 4			C E	
4865 4			C E	
4967 4	0 ⁺		CDE	J^π : L(p, t) = 0.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{34}Ar Levels (continued)

E(level)	J^π	XREF	Comments
5255? 4		C	
5307 13	(5 ⁻)	DE	J^π : L($^3\text{He},n$)=(5).
5542 4		C	
5620 30	2 ⁺	D	J^π : L($^3\text{He},n$)=2.
5909 12	0 ⁺	DE	J^π : L($^3\text{He},n$)=0.
6074 11	2 ⁺	E	J^π : L(p,t)=2.
6525 9	2 ⁺	DE	J^π : L(p,t)=2.
6794 11		DE	
6990 50		D	
7322 6	2 ⁺	DE	J^π : L(p,t)=2.
7499 4	(2 ⁺)	E	J^π : L(p,t)=(2).
7925 5		E	

† From DSAM in $^3\text{He}(^{32}\text{S},n\gamma)$, $^{32}\text{S}(^3\text{He},n\gamma)$. Most values are from 1985A118.

$E_i(\text{level})$	J_i^π	$\gamma(^{34}\text{Ar})$						Comments
		E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.†	δ^\dagger	
2091.1	2 ⁺	2091.1 3	100	0	0 ⁺	E2		B(E2)(W.u.)=6.8 9
3287.7	2 ⁺	1196.6 4	100 5	2091.1	2 ⁺	M1+E2	+0.12 5	B(M1)(W.u.)=0.060 12; B(E2)(W.u.)=2.4 20
		3286 4	9 6	0	0 ⁺	[E2]		B(E2)(W.u.)=0.10 7
3873	0 ⁺	585#	<43	3287.7	2 ⁺			
		1782 3	100	2091.1	2 ⁺	[E2]		B(E2)(W.u.)<21
4127.8		840.1 9	100 6	3287.7	2 ⁺			
		2037	11 6	2091.1	2 ⁺			
		4128#	<11	0	0 ⁺			
4513.2	3 ⁻	1225.5 6	100 11	3287.7	2 ⁺	[E1]		B(E1)(W.u.)=0.0016 4
		2422	11 3	2091.1	2 ⁺	[E1]		B(E1)(W.u.)=2.2×10 ⁻⁵ 8
4631		2540	100	2091.1	2 ⁺			%I γ >50.
4865		2774	100	2091.1	2 ⁺			%I γ >50.
4967	0 ⁺	841#	<20	4127.8				
		2876	100	2091.1	2 ⁺			%I γ >50.
5255?		3164#	100	2091.1	2 ⁺			%I γ >50.
5542		911	54‡ 16	4631				
		1029	100‡ 16	4513.2	3 ⁻			

† From $^3\text{He}(^{32}\text{S},n\gamma)$, $^{32}\text{S}(^3\text{He},n\gamma)$.

‡ Tentative value of branching ratio.

Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)