^{35}Ar ε decay (1.7756 s) 1980Wi13,1984Ad01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, John Cameron and Balraj Singh	NDS 112,2715 (2011)	20-Oct-2011

Parent: ^{35}Ar: E=0; $J^\pi=3/2^+$; $T_{1/2}$=1.7756 s *10*; Q(ε)=5966.1 *7*; %ε+%β^+ decay=100.0

^{35}Ar-Q(ε): From 2011AuZZ and 2003Au03.

^{35}Ar-J^π,$T_{1/2}$: From Adopted Levels of ^{35}Ar.

1980Wi13: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction with 11.0 MeV protons from the ONR-CIT tandem accelerator and targets of LiCl and $PbCl_2$ wrapped in 25 μm Ta foil. A 100 cm^3 Ge(Li) detector for detecting γ-rays. Measured Eγ, Iγ. Deduced levels, Iβ.

1984Ad01: ^{35}Ar activity produced by bombarding thick KCl targets with 13 MeV proton beam from the University of Washington FN tandem accelerator. A 28% Ge(Li) detector. Measured Eγ, Iγ. Deduced levels Iβ, γ-branchings.

1960Wa04: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction with protons from the 60-inch cyclotron at Crocker Laboratory and the Lawrence Radiation Laboratory. Measured Eγ, Iγ. Deduced log *ft* for the transition to ^{35}Cl ground state.

1969Wi18,1969Fr09: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction with protons from the the Harwell tandem accelerator and targets of 3.75 mg/cm^2 KCl on 0.13 mm Au backings. Ge(Li) detector. Measured Eγ, Iγ. Deduced levels, Iβ.

1971Ge04: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction with 10 MeV protons from the the Chalk River tandem accelerator and targets of $PbCl_2$. Two coaxial Ge(Li) detectors. Measured Eγ, Iγ. Deduced levels, Iβ.

1971De05: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction. A 25 cm^3 Ge(Li) detector. Measured Eγ,Iγ. Deduced levels, Iβ.

1977Az01: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction with protons from the McGill synchrocyclotron and targets of CCl_4 and LiCl. A 18% Ge(Li) detector. Measured Eγ, Iγ. Deduced Iβ for decay to the ground state of ^{35}Cl.

1979Ha04: ^{35}Ar activity produced by bombarding a 38 g/cm^2 vanadium target with 1 μA of 600 MeV protons from the CERN synchrocyclotron. Beam particles separated by the ISOLDE separator. A Ge(Li) detector. Measured Eγ, Iγ. Deduced levels, Iβ.

1985Da04: ^{35}Ar activity produced by bombarding a NaCl target with 9 MeV protons. A 28% Ge(Li) detector. Measured Eγ, Iγ. Deduced levels, Iβ.

1956Ki29: ^{35}Ar activity produced by ^{35}Cl(p,n)^{35}Ar reaction with protons from the Brookhaven 60-inch cyclotron and targets of CCl_4. NaI(Tl) crystal scintillation counter. Measured Eγ, Iγ. Deduced levels, Iβ.

Others: 1965Ca04, 1988Ga02, 1991Mi18, 1991Na05, 1993Co07, 1996Kl04, 2006Ia05.

^{35}Cl Levels

In 1971De05, β feeding to a 3163 level was measured as <0.025%, but this level has not been seen through γ-rays in any of the later studies.

E(level)[†]	J^π[#]	$T_{1/2}$
0	$3/2^+$	stable
1219.22 *17*	$1/2^+$	
1763.11 *16*	$5/2^+$	
2645.2 *8*	$3/2^+$	
2693.85 *15*	$3/2^+$	
3002.3 *4*	$5/2^+$	
3918.3 *7*	$3/2^+$	
3967.7 *4*	$1/2^+$	
4624.5?[‡] *6*	$(3/2,5/2^+)$	

[†] From least-square fits to Eγ's, unless otherwise noted.
[‡] From 1980Wi13.
[#] From Adopted Levels.

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ε,β+ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(1341.6‡ *9*)	4624.5?	<8.2×10^{-5}	<0.00036	>4.8	<4.4×10^{-4}	av Eβ=130.08 *38*; εK=0.7351 *14*; εL=0.07038 *14*; εM+=0.009067 *18* Iβ+: from 1980Wi13.
(1998.4 *8*)	3967.7	0.0069 *7*	0.00070 *7*	4.81 *5*	0.0076 *8*	av Eβ=406.67 *36*; εK=0.08271 *20*; εL=0.007909 *19*; εM+=0.0010187 *2* Iβ+: weighted average of 0.00744 *87* (1980Wi13) and 0.00763 *74* (1984Ad01).
(2047.8 *10*)	3918.3	0.0073 *5*	0.00063 *4*	4.88 *3*	0.0079 *5*	av Eβ=428.32 *44*; εK=0.07161 *21*; εL=0.006847 *20*; εM+=0.000882 *3* Iβ+: weighted average of 0.0079 *5* (1980Wi13) and 0.0104 *42* (1984Ad01).
(2963.8 *8*)	3002.3	0.088 *3*	0.00105 *3*	4.973 *13*	0.0895 *26*	av Eβ=843.54 *38*; εK=0.010573 *14*; εL=0.0010101 *1*; εM+=0.00013011 Iβ+: weighted average of 0.11 *3* (1971Ge04), 0.071 *18* (1971De05), 0.0901 *33* (1980Wi13), 0.093 *6* (1984Ad01), 0.085 *6* (1985Da04).
(3272.3 *7*)	2693.85	0.163 *7*	0.00123 *5*	4.989 *19*	0.164 *7*	av Eβ=987.52 *34*; εK=0.006789 *7*; εL=0.0006485 *7*; εM+=8.352×10^{-5} *8* Iβ+: weighted average of 0.16 *4* (1971Ge04), 0.195 *25* (1971De05), 0.161 *7* (1980Wi13), 0.171 *11* (1984Ad01), 0.161 *9* (1985Da04).
(3320.9 *11*)	2645.2	<0.03	<0.0002	>5.8	<0.03	av Eβ=1010.36 *50*; εK=0.006367 *9*; εL=0.0006081 *9*; εM+=7.833×10^{-5} *11* Iβ+: from 1971De05.
(4203.0 *7*)	1763.11	0.248 *11*	0.00067 *3*	5.475 *20*	0.249 *11*	av Eβ=1429.30 *35*; εK=0.002411 *2*; εL=0.0002302 *2*; εM+=2.965×10^{-5} *2* Iβ+: weighted average of 0.234 *13* (1969Wi18 and 1969Fr09), 0.22 *5* 1971Ge04, 0.220 *25* (1971De05), 0.266 *11* (1985Da04), 0.250 *16* (1984Ad01).
(4746.9 *7*)	1219.22	1.23 *3*	0.00205 *5*	5.091 *11*	1.23 *3*	av Eβ=1691.20 *35*; εK=0.0015072 *9*; εL=0.000144; εM+=1.853×10^{-5} *1* Iβ+: weighted average of 1.223 *46* (1969Wi18 and 1969Fr09), 1.22 *20* (1971Ge04), 1.34 *8* (1979Ha04), 1.23 *7* (1984Ad01). 1.228 *30* (1980Wi13).
(5966.1 *7*)	0	98.16 *5*	0.0708 *7*	3.7520 *5*	98.23 *5*	av Eβ=2284.46 *35*; εK=0.0006503 *3*; εL=6.207×10^{-5} *3*; εM+=7.994×10^{-6} *4* Iβ+: weighted average of 98.3 *2* (1971Ge04), 98.0 *2* (1977Az01), 98.235 *52* (1980Wi13) and 98.24 *10* (1984Ad01). 1969Wi18 and 1969Fr09 gives 98.54 *5*.

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{35}Cl)

Eγ†	Iγ†#	Ei(level)	J_i^π	Ef	J_f^π
357		3002.3	5/2+	2645.2	3/2+
544	<0.153	1763.11	5/2+	1219.22	1/2+
916‡@	‡	3918.3	3/2+	3002.3	5/2+

Continued on next page (footnotes at end of table)

^{35}Ar ε decay (1.7756 s) 1980Wi13,1984Ad01 (continued)

γ(^{35}Cl) (continued)

E_γ[†]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Comments
930.7 *2*	1.57 *20*	2693.85	$3/2^+$	1763.11	$5/2^+$	I_γ: weighted average of 1.13 *26* (1980Wi13) and 1.66 *12* (1984Ad01).
965[‡]	<0.87[‡]	3967.7	$1/2^+$	3002.3	$5/2^+$	Additional information 1.
1219.3 *2*	100.0 *15*	1219.22	$1/2^+$	0	$3/2^+$	I_γ: weighted average from 1980Wi13 and 1984Ad01.
1225[‡@]	[‡]	3918.3	$3/2^+$	2693.85	$3/2^+$	
1239	<0.06	3002.3	$5/2^+$	1763.11	$5/2^+$	
1274[‡]	<0.42[‡]	3967.7	$1/2^+$	2693.85	$3/2^+$	
1474.8 *3*	1.02 *11*	2693.85	$3/2^+$	1219.22	$1/2^+$	I_γ: weighted average of 0.83 *13* (1980Wi13) and 1.08 *7* (1984Ad01).
1763.0 *2*	22.6 *4*	1763.11	$5/2^+$	0	$3/2^+$	I_γ: weighted average from 20.0 *27* (1971Ge04), 21.7 *9* (1985Da04), 21.85 *67* (1984Ad01).
1783	<0.05	3002.3	$5/2^+$	1219.22	$1/2^+$	
1931[‡]	<0.21[‡]	4624.5?	$(3/2,5/2^+)$	2693.85	$3/2^+$	
2155.1 *15*	0.15 *6*	3918.3	$3/2^+$	1763.11	$5/2^+$	
2204[‡]	<0.27[‡]	3967.7	$1/2^+$	1763.11	$5/2^+$	
2645	<0.12	2645.2	$3/2^+$	0	$3/2^+$	E_γ,I_γ: from 1971De05.
2693.7 *2*	10.96 *18*	2693.85	$3/2^+$	0	$3/2^+$	I_γ: weighted average of 10.2 *15* (1971Ge04), 10.96 *18* (1980Wi13) and 11.02 *34* (1984Ad01).
2699[‡]	<0.33[‡]	3918.3	$3/2^+$	1219.22	$1/2^+$	
2748.5 *6*	0.477 *34*	3967.7	$1/2^+$	1219.22	$1/2^+$	I_γ: weighted average of 0.48 *6* (1980Wi13) and 0.476 *34* (1984Ad01).
2861[‡]	<0.1[‡]	4624.5?	$(3/2,5/2^+)$	1763.11	$5/2^+$	
3002.1 *4*	7.29 *14*	3002.3	$5/2^+$	0	$3/2^+$	I_γ: weighted average of 9.0 *15* (1971Ge04), 7.24 *14* (1980Wi13), 7.45 *23* (1984Ad01) and 6.9 *5* (1985Da04).
3405[‡@]	[‡]	4624.5?	$(3/2,5/2^+)$	1219.22	$1/2^+$	
3918[‡]	0.52[‡] *3*	3918.3	$3/2^+$	0	$3/2^+$	
3968[‡]	0.106[‡] *25*	3967.7	$1/2^+$	0	$3/2^+$	
4624[‡]	<0.035[‡]	4624.5?	$(3/2,5/2^+)$	0	$3/2^+$	

[†] From 1984Ad01, unless otherwise noted.
[‡] From 1980Wi13.
[#] For absolute intensity per 100 decays, multiply by 0.0135 *4*.
[@] Placement of transition in the level scheme is uncertain.

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Decay Scheme

Intensities: I_γ per 100 parent decays