^{42}Cl β^- decay (6.8 s) 1981HuZT,1998WiZX

History

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

Parent: ^{42}Cl: E=0; J^π=(2$^-$); $T_{1/2}$=6.8 s *3*; Q(β^-)=9.51×10^3 *14*; %β^- decay=100.0
^{42}Cl-J^π,$T_{1/2}$: From Adopted Levels of ^{42}Cl.
^{42}Cl-Q(β^-): From 2012Wa38.
1998WiZX: measured Eγ, Iγ, $\gamma\gamma$.
1981HuZT, 1989Mi03: measured Eγ, Iγ, $\gamma\gamma$. 1989Mi03 give $\beta\gamma$ coin results.

^{42}Ar Levels

Additional information 1.

E(level)†	J^π‡	E(level)†	E(level)†	J^π‡	E(level)†
0	0$^+$	4045.1 *7*	4566?#		5015?#
1207.7 *6*	2$^+$	4057?#	4607?#		5260?#
2413.4 *8*	(4$^+$)	4131	4619?#		5282?#
2485.0 *7*	2$^+$	4181?#	4633	(3$^-$)	5297?#
2511		4196?#	4735?#		5506?#
3013.1 *10*	(1,2$^+$)	4266?#	4812?#		5529?#
3094.9 *9*	4$^+$	4313?#	4827?#		5792?#
3556	2$^+$	4352?#	4902?#		6412?#
3846		4416.5 *6*	4936?#		7648?#
4012.9 *7*		4527?#	4941?#		

† From 1981HuZT, except for levels where Eγ values are quoted with uncertainties, which are from 1998WiZX.
‡ From Adopted Levels.
# Most levels above 4000 keV, reported only by 1981HuZT, are considered as tentative in view of a comment by 1989Mi03 that the level scheme proposed earlier (1981HuZT) has been revised by taking account of source impurities. However, this revision is not available in the literature. The tentative levels are not included in the Adopted Levels, Gammas dataset.

β^- radiations

E(decay)	E(level)	Comments
(1.86×10^3 *14*)	7648?	Iβ^-: 0.066 (1981HuZT).
(3.10×10^3 *14*)	6412?	Iβ^-: 0.051 (1981HuZT).
(3.72×10^3 *14*)	5792?	Iβ^-: 0.092 (1981HuZT).
(3.98×10^3 *14*)	5529?	Iβ^-: 0.032 (1981HuZT).
(4.00×10^3 *14*)	5506?	Iβ^-: 0.71 (1981HuZT).
(4.21×10^3 *14*)	5297?	Iβ^-: 2.6 (1981HuZT).
(4.23×10^3 *14*)	5282?	Iβ^-: 1.3 (1981HuZT).
(4.25×10^3 *14*)	5260?	Iβ^-: 0.19 (1981HuZT).
(4.50×10^3 *14*)	5015?	Iβ^-: 0.21 (1981HuZT).
(4.57×10^3 *14*)	4941?	Iβ^-: 0.31 (1981HuZT).
(4.57×10^3 *14*)	4936?	Iβ^-: 0.56 (1981HuZT).
(4.61×10^3 *14*)	4902?	Iβ^-: 0.12 (1981HuZT).
(4.68×10^3 *14*)	4827?	Iβ^-: 0.28 (1981HuZT).
(4.70×10^3 *14*)	4812?	Iβ^-: 0.71 (1981HuZT).
(4.78×10^3 *14*)	4735?	Iβ^-: 0.24 (1981HuZT).
(4.88×10^3 *14*)	4633	Iβ^-: 0.50 (1981HuZT).

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^{42}Cl β^- decay (6.8 s) 1981HuZT,1998WiZX (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(4.89×10^3 *14*)	4619?			Iβ^-: 0.06 (1981HuZT).
(4.90×10^3 *14*)	4607?			Iβ^-: 2.64 (1981HuZT).
(4.94×10^3 *14*)	4566?			Iβ^-: 0.19 (1981HuZT).
(4.98×10^3 *14*)	4527?			Iβ^-: 0.04 (1981HuZT).
(5.09×10^3 *14*)	4416.5	17	≈5.5	av Eβ=2280 *59* Iβ^-: from 1989Mi03. Others: 15 (1998WiZX), 11.6 (1981HuZT). E(β^-)=3959 *1400* (1989Mi03).
(5.16×10^3 *14*)	4352?			Iβ^-: 0.10 (1981HuZT).
(5.20×10^3 *14*)	4313?			Iβ^-: 0.09 (1981HuZT).
(5.24×10^3 *14*)	4266?			Iβ^-: 0.59 (1981HuZT).
(5.31×10^3 *14*)	4196?			Iβ^-: 0.21 (1981HuZT).
(5.33×10^3 *14*)	4181?			Iβ^-: 0.20 (1981HuZT).
(5.38×10^3 *14*)	4131			Iβ^-: 1.17 (1981HuZT).
(5.45×10^3 *14*)	4057?			Iβ^-: 0.12 (1981HuZT).
(5.46×10^3 *14*)	4045.1	26	≈5.4	av Eβ=2462 *59* Iβ^-: from 1989Mi03. Others: 19 (1998WiZX), 17.6 (1981HuZT). E(β^-)=4676 *1052* (1989Mi03).
(5.50×10^3 *14*)	4012.9			Iβ^-: 4 (1998WiZX), 2.41 (1981HuZT).
(5.66×10^3 *14*)	3846			Iβ^-: 1.14 (1981HuZT).
(5.95×10^3 *14*)	3556			Iβ^-: 0.14 (1981HuZT).
(6.42×10^3 *14*)	3094.9			Iβ^-: 1.52 (1981HuZT).
(6.50×10^3 *14*)	3013.1			Iβ^-: 1.97 (1981HuZT).
(7.00×10^3 *14*)	2511			Iβ^-: 0.12 (1981HuZT).
(7.03×10^3 *14*)	2485.0			Iβ^-: 6 (1998WiZX), 3.7 (1981HuZT).
(7.10×10^3 *14*)	2413.4	19	≈6.1	av Eβ=3263 *59* Iβ^-: from 1989Mi03. Other: 4 (1998WiZX). $\beta\gamma$ coin: E(β^-)=7021 *640*, 7479 *230* (1989Mi03).
(8.30×10^3 *14*)	1207.7			Iβ^-: <5% for g.s.+1208 level (1989Mi03). Other: 30 (1998WiZX). Iβ=27 (1981HuZT) is negated in the later work (1989Mi03).
(9.51×10^3 *14*)	0			Iβ^-: <5% for g.s.+1208 level (1989Mi03). Iβ=20 (1981HuZT) is negated in the later work (1989Mi03).

[†] Absolute intensity per 100 decays.

γ(^{42}Ar)

E$_\gamma$[†]	I$_\gamma$[#]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
403.9[‡&] *6*	0.9 *2*	4416.5		4012.9	
604		5506?		4902?	
767		4812?		4045.1	
1205.7 *5*	9.0[@] *8*	2413.4	(4$^+$)	1207.7	2$^+$
1207.7 *6*	100.0 *6*	1207.7	2$^+$	0	0$^+$
1256		4812?		3556	2$^+$
1269		5282?		4012.9	
1277.3 *5*	16.1 *6*	2485.0	2$^+$	1207.7	2$^+$
1284		5297?		4012.9	
1304		2511		1207.7	2$^+$
1404.7[‡] *4*	1.6 *3*	4416.5		3013.1	(1,2$^+$)
1528		4012.9		2485.0	2$^+$
1560.1 *5*	6.0 *4*	4045.1		2485.0	2$^+$
1572		4057?		2485.0	2$^+$

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^{42}Cl β^- decay (6.8 s) 1981HuZT,1998WiZX (continued)

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

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	E_i(level)	J_i^π	E_f	J_f^π
1598.5& *8*	1.3 *2*	4012.9		2413.4	(4^+)	4181	4181?		0	0^+
1646		4131		2485.0	2^+	4196	4196?		0	0^+
1781		4266?		2485.0	2^+	4266	4266?		0	0^+
1805.4 *8*	1.6 *3*	3013.1	$(1,2^+)$	1207.7	2^+	4313	4313?		0	0^+
1887.2 *7*	1.9 *3*	3094.9	4^+	1207.7	2^+	4352	4352?		0	0^+
1931.7 *6*	4.4 *4*	4416.5		2485.0	2^+	4527	4527?		0	0^+
2003.4& *3*	2.3 *4*	4416.5		2413.4	(4^+)	4566	4566?		0	0^+
2349		3556	2^+	1207.7	2^+	4607	4607?		0	0^+
2485.1 *8*	2.5 *4*	2485.0	2^+	0	0^+	4619	4619?		0	0^+
2639		3846		1207.7	2^+	4735	4735?		0	0^+
2805.3 *7*	5.1 *4*	4012.9		1207.7	2^+	4812	4812?		0	0^+
2837.3 *5*	19.0 *7*	4045.1		1207.7	2^+	4827	4827?		0	0^+
2924		4131		1207.7	2^+	4902	4902?		0	0^+
3013		3013.1	$(1,2^+)$	0	0^+	4936	4936?		0	0^+
3059		4266?		1207.7	2^+	4941	4941?		0	0^+
3208.3 *3*	10.7 *4*	4416.5		1207.7	2^+	5015	5015?		0	0^+
3359		4566?		1207.7	2^+	5260	5260?		0	0^+
3426		4633	(3^-)	1207.7	2^+	5506	5506?		0	0^+
3556		3556	2^+	0	0^+	5529	5529?		0	0^+
3846		3846		0	0^+	5792	5792?		0	0^+
4013		4012.9		0	0^+	6412	6412?		0	0^+
4045		4045.1		0	0^+	7648	7648?		0	0^+
4057		4057?		0	0^+					

† From 1998WiZX for Eγ data quoted with uncertainty. All other Eγ values are differences of level energies as given by 1981HuZT.

‡ From 1998WiZX only.

From 1998WiZX.

@ Value of 0.9 *8* in 1998WiZX seems a misprint, in view of in-out intensity balance and β^- feeding shown in the level scheme of 1998WiZX. On the other hand, %Iβ=19 (1989Mi03) would imply a much larger intensity or the 1205.7 component of the 1206-1208 doublet.

& Placement of transition in the level scheme is uncertain.

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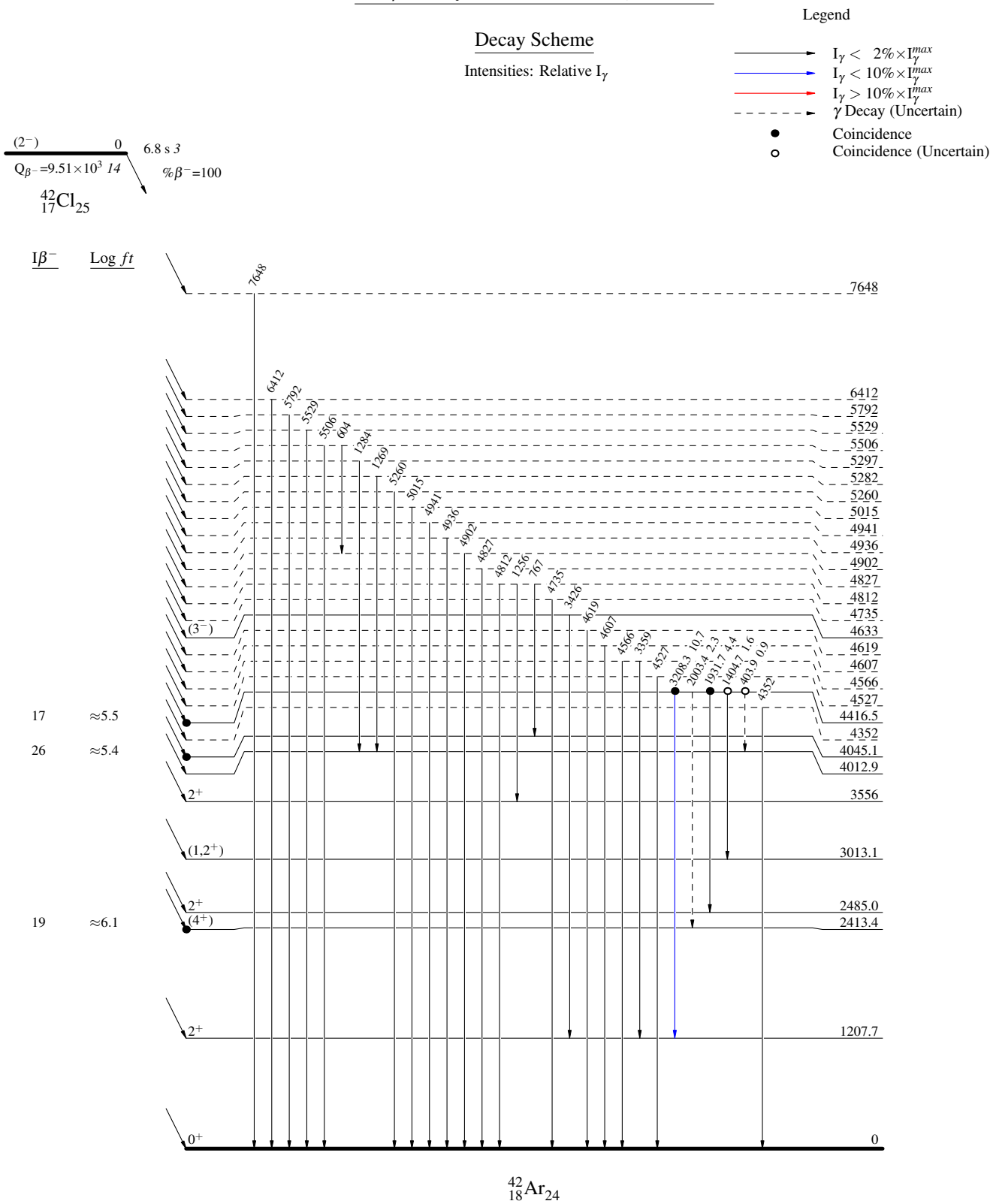
Decay Scheme

Intensities: Relative I_γ



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Decay Scheme (continued)

Intensities: Relative I_γ

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)