^{44}Cl β^- decay (0.54 s) 1999WiZX,2004Mr01,1995So03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 190,1 (2023)	20-Jun-2023

Parent: ^{44}Cl: E=0; $J^\pi=(2^-)$; $T_{1/2}$=0.54 s *11*; Q(β^-)=12190 *90*; %β^- decay=100

^{44}Cl-J^π,$T_{1/2}$: From ^{44}Cl Adopted Levels, where adopted $T_{1/2}$ is taken from unweighted average of 650 ms *50* (1999WiZX) and 434 ms *60* (1995So03).

^{44}Cl-Q(β^-): From 2021Wa16.

^{44}Cl-%β^- decay: %β^-n<8 (1995So03).

2004Mr01: ^{44}Cl produced by E=60 MeV/nucleon ^{48}Ca beam fragmented on a Be target and selected by the spectrometer LISE3 at GANIL. Isotopes implanted into a double-sided Si detector surrounded by two coaxial HPGe and one EXOGAM four-fold clover detector; two plastic scintillators for detecting β radiation. Measured Eγ, Iγ. Deduced levels, branchings.

1999WiZX: ^{44}Cl produced by fragmentation of ^{48}Ca beam at 70 MeV/nucleon with a Be target. Measured Eγ, Iγ, $\gamma\gamma$ coin and $\beta\gamma\gamma$ coin using Ge and Si detectors.

1995So03: ^{44}Cl identified in ^{64}Ni(^{48}Ca,X) E=60 MeV/nucleon.

The ^{44}Cl decay branch to ^{43}Ar by β^-n is <8%.

The level scheme is from 1999WiZX.

^{44}Ar Levels

E(level)†	J^π‡	$T_{1/2}$‡	Comments
0.0	0^+	11.87 min *5*	
1158.14 *11*	2^+	3.80 ps *+49−33*	
2010.93 *14*	(2^+)	1.53 ps *+20−17*	
2746.37 *30*	(4^+)	2.7 ps *+25−20*	J^π: γ to 0^+ makes (4^+) less likely. It is possible that either the level populated here is different from the one populated in the in-beam γ-ray studies or that the 2747γ should be placed elsewhere.
2976.25 *17*			
4807.68 *28*			
5352.22 *29*			

† From a least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=0.5 keV where not given. In the fitting procedure, $\Delta E\gamma$ for 2010.18γ has been increased to 0.5 keV from 0.18 keV to decrease the reduced χ^2 to 2.68 from 3.92.

‡ From the Adopted Levels.

$\gamma(^{44}Ar)$

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
852.77 *10*	60.8 *13*	2010.93	(2^+)	1158.14	2^+		
965.32 *12*	8.3 *6*	2976.25		2010.93	(2^+)		
1158.11 *12*	100 *4*	1158.14	2^+	0.0	0^+	E2	Mult.: from the Adopted Gammas.
1588.1 *3*	3.6 *3*	2746.37	(4^+)	1158.14	2^+		
1817.7 *3*	3.9 *4*	2976.25		1158.14	2^+		
2010.18 *18*	41.8 *13*	2010.93	(2^+)	0.0	0^+		Poor fit; level-energy difference=2010.88 *14*.
2375.6 *3*	8.1 *5*	5352.22		2976.25			
2747.0 *8*	1.7 *3*	2746.37	(4^+)	0.0	0^+	[E4]	
2796.0 *4*	49.0 *20*	4807.68		2010.93	(2^+)		
3338.4 *15*	3.3 *6*	5352.22		2010.93	(2^+)		Level-energy difference=3341.15 *27*.
3649.8‡		4807.68		1158.14	2^+		
4195.0‡		5352.22		1158.14	2^+		Level-energy difference=4193.87 *27*.
4808.0‡		4807.68		0.0	0^+		

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$\gamma(^{44}Ar)$ (continued)

† From 1999WiZX, unless otherwise noted. The intensities are not corrected for summing effects, unless otherwise noted.
‡ From 2004Mr01.

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Decay Scheme

Intensities: Relative I_γ