Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 152, 1 (2018)	30-Sep-2017

Q(β^-)=−17810 *SY*; S(n)=16993.8 *7*; S(p)=4547.27 *22*; Q(α)=−6105.12 *21* 2017Wa10
Δ(Q(β^-))=200 (syst,2017Wa10).
S(2n)=31750 *40*, S(2p)=6404.90 *20*, Q(εp)=1600.19 *28* (2017Wa10).
First identification of ^{38}Ca nuclide was by 1966Ha32 via ^{40}Ca(p,t) according to 2011Am01 compilation of isotope discovery.
Additional information 1.
Mass measurement: 2011Er02, 2008Ge08, 2007Ge07, 2007Ri08, 2006Bo11.

^{38}Ca Levels

Cross Reference (XREF) Flags

A	^{39}Ti εp decay (28.5 ms)	E	^{36}Ar(^{3}He,nγ)
B	^{39}Sc p decay:?	F	^{40}Ca(p,t)
C	^{24}Mg(^{16}O,2nγ)	G	Coulomb excitation
D	^{36}Ar(^{3}He,n)		

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               Isospin T=1 (triplet) states

38Ar          38Ca          ΔE(1)      38K              ΔE(2)
   0,0+       0,0+               130,0+ T=1
2167,2+    2213,2+    +46      2401,2+ T=1    +104,+58
3377,0+    3084,0+    -293
3810,3-    3704,3-    -106
3937,2+    3684,2+    -253
ΔE(1)=E(38Ca)-E(38Ar)
ΔE(2)=E(38K)-E(38Ar)-130,        E(38K)-E(38Ca)-130
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E(level)†	Jπ	$T_{1/2}$‡	XREF	Comments
0	0+	443.76 ms *35*	A CDEFG	%ε+%β^+=100 $T_{1/2}$: weighted average of 443.63 ms *35* (2015Bl02), 443.77 ms *36* (2011Pa38), 443.8 ms *19* (2010Bl09), 430 ms *12* (1980Wi13), 450 ms *70* (1972Zi02), 439 ms *12* (1969Ga27), and 470 ms *20* (1968Ka15). Other: 660 ms *50* (1957Cl23), based on the observation of a 3.5 MeV γ which could not be confirmed in the studies afterwards.
2213.2 *10*	2+	0.56 ps *+16−10*	A CDEFG	B(E2)↑=0.0096 *21* XREF: D(2224). Jπ: L(p,t)=2 from 0+; Coulomb excitation from 0+. $T_{1/2}$: from B(E2)↑. Other: 68 fs *+30−28* from DSAM in (^{3}He,nγ). B(E2)↑ from 1999Co23 in Coulomb excitation.
3083.7 *12*	0+	19 ps *+10−7*	DEF	Jπ: L(p,t)=0 from 0+.
3683.9 *5*	2+	29 fs *+15−9*	dEfG	B(E2)↑=0.0122 *30* Jπ: L(p,t)=2; L(^{3}He,n)=2 or 2+3 for a doublet; Coulomb excitation from 0+. $T_{1/2}$: from B(E2)↑ and adopted γ-ray branching ratios. Other: <5.5 fs from DSAM in (^{3}He,nγ). B(E2)↑ from 1999Co23 in Coulomb excitation.
3703.5 *10*	(3−)	0.16 ps *+7−6*	dEf	Jπ: systematics of even-even nuclides; L(^{3}He,n)=2+3 for a doublet composed of 3684 and 3703 levels. L(p,t) also shows some evidence of presence of L=3 component.
4193.5 *15*	(5−)		EF	E(level): other: 4191 *5* from (p,t). Jπ: L(p,t)=(5) from 0+.

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Adopted Levels, Gammas (continued)

^{38}Ca Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
4383.9 *11*	2^+	24 fs *+12–8*	dEF	E(level): other: 4385 *4* from (p,t). Jπ: L(p,t)=2 from 0^+; L(^{3}He,n)=2+5 for a doublet.
4412 *30*	(5^-)		d	Jπ: L(^{3}He,n)=2+5 for a doublet.
4748 *5*	0^+		D F	E(level): other: 4751 *5* from (^{3}He,n). Jπ: L(^{3}He,n)=0 from 0^+. L(p,t)=(3) is inconsistent. There may be a doublet near this energy, but due to tentative nature of L(p,t), the evidence for two levels is not sufficient.
4860 *40*	(3^-)		D	E(level): from (^{3}He,n). Jπ: L(^{3}He,n)=3,(2+4). This group may be a doublet in (^{3}He,n); L=(2+4) may correspond to 4899, 2^+ level from (p,t).
4902 *4*	2^+		F	Jπ: L(p,t)=2 from 0^+.
5164 *7*	2^+		D F	XREF: D(5140). E(level): other: 5140 *60* from (^{3}He,n). Jπ: L(^{3}He,n)=2 from 0^+.
5266 *4*	2^+		F	Jπ: L(p,t)=2 from 0^+.
5430 *6*			F	
5601 *7*	3^-		D F	XREF: D(5560). E(level): other: 5560 *60* from (^{3}He,n). Jπ: L(^{3}He,n)=3 from 0^+.
5704 *5*			F	
5816 *7*	(4^+)		D F	XREF: D(5790). E(level): other: 5790 *40* from (^{3}He,n). Jπ: L(^{3}He,n)=(4) from 0^+.
6136 *6*			F	
6277 *3*	0^+		F	Jπ: L(p,t)=0 from 0^+.
6485 *6*			F	
6601 *3*			F	
6704 *3*			F	
6770 *13*			D F	E(level): other: 6760 *50* from (^{3}He,n).
6801 *12*			F	
6950 *5*			F	
7041 *8*			F	
7176 *4*			d F	XREF: d(7200).
7208 *15*			d F	XREF: d(7200).
7480 *9*			D F	E(level): other: 7470 *50* from (^{3}He,n).
7801 *3*			F	
8026 *5*			F	
8189 *6*			F	
8322 *5*			F	
8507 *9*			F	
8587 *3*			F	
8672 *6*			F	
8717 *8*			F	
8924 *9*			F	
8994 *9*			F	
9073 *9*			F	
9157 *8*			F	
9230 *9*			F	
9296 *8*			F	
9735 *8*			F	
9809 *6*			F	
10104 *9*			F	
10410 *9*			F	
10557 *8*			F	
10946 *11*			F	
11089 *11*			F	

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Adopted Levels, Gammas (continued)

^{38}Ca Levels (continued)

E(level)†	XREF
11189 *13*	F
11861 *11*	F

† From a least-squares fit to γ-ray energies for levels connected with γ transitions and from (p,t) for the rest, unless otherwise noted.
‡ From DSAM in (^{3}He,nγ), unless otherwise noted.

γ(^{38}Ca)

E_i(level)	J_i^π	E_γ†	I_γ	E_f	J_f^π	Comments
2213.2	2^+	2213.13	100	0	0^+	B(E2)(W.u.)=2.5 *6* E_γ: other: 2212.5 *14* from ^{39}Ti εp decay, 2206 *10* from Coulomb excitation.
3083.7	0^+	870.5 *5*	100	2213.2	2^+	B(E2)(W.u.)=8 *+3−5*
3683.9	2^+	1471‡	19 *14*	2213.2	2^+	E_γ: other: 1448 *25* from Coulomb excitation. I_γ: from Coulomb excitation.
		3683.7 *5*	100 *14*	0	0^+	B(E2)(W.u.)=3.2 *12* E_γ: other: 3685 *21* from Coulomb excitation. I_γ: from Coulomb excitation.
3703.5	(3^-)	1490.22 *11*	100	2213.2	2^+	B(E1)(W.u.)=0.0011 *+7−3*
4193.5	(5^-)	490		3703.5	(3^-)	
4383.9	2^+	2170.6 *4*	100	2213.2	2^+	

† From (^{3}He,nγ), unless otherwise noted.
‡ Placement of transition in the level scheme is uncertain.

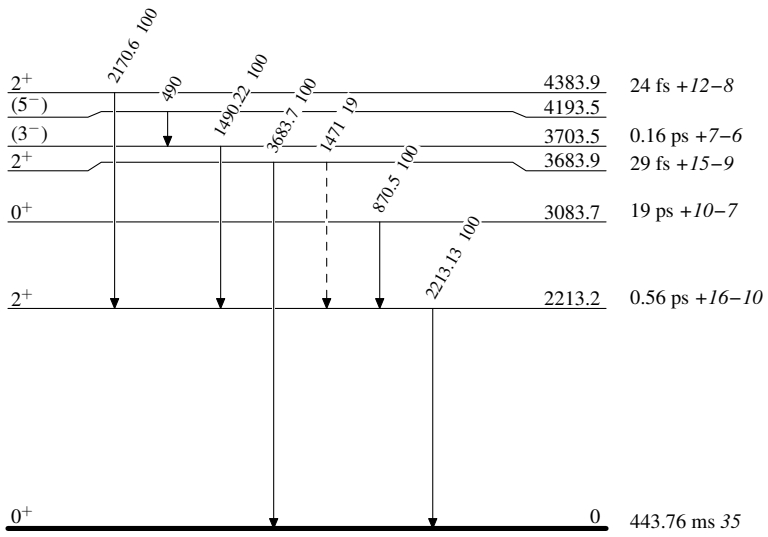
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{38}_{20}Ca_{18}$