^{39}Ca ε decay (860.3 ms) 1994Ha07,1984Ad01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 149, 1 (2018)	1-Jan-2018

Parent: ^{39}Ca: E=0; $J^\pi=3/2^+$; $T_{1/2}$=860.3 ms *10*; Q(ε)=6524.5 *6*; %ε+%$β^+$ decay=100.0

^{39}Ca-J^π: From Adopted Levels of ^{39}Ca.

^{39}Ca-$T_{1/2}$: Weighted average of 860.7 ms *10* (2010Bl09), 860.4 ms *30* (1973Al11) and 859.4 ms *16* (1977Az01). Others: 0.76 s *20* (1994Ha07), 0.95 s *4* (1964Ba24), 0.89 s *5* (1960Wa04), 0.873 s *8* (1960Li05), 0.860 s *5* (1958Mi85), 0.876 s *12* (1958Cl41), 0.90 s *1* (1954Kl36), 1.00 s *3* (1953Su81), 1.00 s *5* (1953Br07), 1.06 s *3* (1943Hu02).

^{39}Ca-Q(ε): From 2017Wa10.

1994Ha07: ^{39}Ca source was produced by bombardment of a stack of 190 μg/cm^2 thick KF targets with 13 MeV proton beam from the TASCC facility at the Chalk River Laboratories. γ rays were detected with a HPGe detector and β particles were detected with β scintillators. A pair of plastic scintillators in front of HPGe detector was used to reject events from bremsstrahlung from positrons. Very weak γ rays could be detected with a high degree of sensitivity. Measured Eγ, Iγ, γβ-coin. Deduced levels, decay branching ratios, log *ft*, parent $T_{1/2}$, matrix elements. Comparisons with theoretical calculations.

1984Ad01: ^{39}Ca source was produced from thick targets of KCL bombarded by 13 MeV proton beam from the University of Washington FN tandem. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ. Deduced decay branching ratios.

Others:

2010Bl09: Measured parent $T_{1/2}$.

1992Ma63: fragment recoil separation in ^{197}Au(^{40}Ca,X).

1978Ra15: measured Eβ, deduced Q value.

1977Az01, 1973Al11: measured isotopic $T_{1/2}$.

1976Ma14: measured Iγ.

1971De05: measured βγ coin.

1964Ba24: measured $T_{1/2}$.

1960Ta14: measured γ.

1960Wa04: measured Eβ, half-life.

Pre-1960 references dealing with identification, production and half-life measurement: 1958Ki40, 1958Mi85, 1954Kl36, 1954Hu23, 1953Su81, 1953Br07, 1951Bo56, 1949Mc17, 1948Wa13, 1943Hu02.

Additional information 1.

^{39}K Levels

E(level)	J^π†	E(level)	J^π†	E(level)	J^π†	E(level)	J^π†
0	$3/2^+$	3019	$3/2^-$	3939	$3/2^+$	4095	$1/2^+$
2522.34 *26*	$1/2^+$	3597	$9/2^-$	3944	$11/2^-$	4126	$7/2^-$
2814	$7/2^-$	3883	$5/2^-$	4082	$3/2^-$	4474	$1/2^-$,$3/2^-$

† From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(2050.5# *6*)	4474	<0.00044	$<5.6\times10^{-5}$	>5.8	<0.00050	av Eβ=431.24 *27*; εK=0.10140 *17*; εL=0.009971 *17*; εM+=0.001615 *3*
(2398.5# *6*)	4126	<0.00031	$<5.2\times10^{-5}$	>7.3[1u]	<0.00036	av Eβ=616.97 *27*; εK=0.13076 *18*; εL=0.012892 *18*; εM+=0.002089 *3*
(2429.5# *6*)	4095	<0.00034	$<1.6\times10^{-5}$	>6.4	<0.00036	av Eβ=600.71 *28*; εK=0.04043 *6*; εL=0.003973 *5*; εM+=0.0006435 *9*
(2442.5# *6*)	4082	<0.00033	$<1.5\times10^{-5}$	>6.5	<0.00035	av Eβ=606.59 *28*; εK=0.03934 *5*; εL=0.003866 *5*; εM+=0.0006262 *8*

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^{39}Ca ε decay (860.3 ms) 1994Ha07,1984Ad01 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(2580.5# *6*)	3944	<0.0028	<9.6×10^{-5}	>5.7	<0.0029	av Eβ=669.24 *28*; εK=0.02982 *4*; εL=0.002931 *4*; εM+=0.0004747 *6*
(2585.5# *6*)	3939	<0.00030	<1.0×10^{-5}	>6.7	<0.00031	av Eβ=671.52 *28*; εK=0.02954 *4*; εL=0.002903 *4*; εM+=0.0004701 *6*
(2641.5# *6*)	3883	<0.00039	<1.2×10^{-5}	>6.7	<0.00040	av Eβ=697.08 *28*; εK=0.02659 *3*; εL=0.002612 *3*; εM+=0.0004231 *5*
(2927.5# *6*)	3597	<0.00070	<1.3×10^{-5}	>6.7	<0.00071	av Eβ=828.25 *28*; εK=0.01635 *2*; εL=0.001606 *2*; εM+=0.0002602 *3*
(3505.5# *6*)	3019	<0.00033	<2.7×10^{-6}	>7.5	<0.00033	av Eβ=1099.16 *29*; εK=0.007381 *6*; εL=0.0007248 *6*; εM+=0.000117
(3710.5# *6*)	2814	<0.00035	<5.9×10^{-6}	>9.0^{1u}	<0.00036	av Eβ=1221.69 *29*; εK=0.01467 *1*; εL=0.001443 *1*; εM+=0.0002337 *2*
(4002.2 *7*)	2522.34	0.0025 *3*	1.19×10^{-5} *13*	7.02 *5*	0.00250 *27*	av Eβ=1334.96 *32*; εK=0.004282 *3*; εL=0.0004204 *3*; εM+=6.808×10^{-5} *5* I(ε+β+): from 1994Ha07. Other: 0.0023 *6* (1984Ad01). Interpreted as $1d_{3/2}$ to $2s_{1/2}$ l-forbidden transition (1994Ha07).
(6524.5 *6*)	0	99.920 *3*	0.0771 *8*	3.6300 *6*	99.9975 *27*	av Eβ=2558.27 *30*; εK=0.0006923 *3*; εL=6.792×10^{-5} *3*; εM+=1.1000×10^{-5} *4* I(ε+β+): assuming total feeding (to g.s.+2522)=100.

† From measured limits of γ-ray intensities (1994Ha07).
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{39}K)

Eγ †	Iγ‡	Ei(level)	J_i^π	Ef	J_f^π	Comments
1130		3944	11/2$^-$	2814	7/2$^-$	
1312		4126	7/2$^-$	2814	7/2$^-$	
1573		4095	1/2$^+$	2522.34	1/2$^+$	
1952		4474	1/2$^-$,3/2$^-$	2522.34	1/2$^+$	
2522.2 *3*	0.0025 *3*	2522.34	1/2$^+$	0	3/2$^+$	Eγ: weighted average of 2522.25 *26* from 1994Ha07 and 2522.0 *4* from 1984Ad01. Iγ: from Iβ feeding.
2814		2814	7/2$^-$	0	3/2$^+$	
3019		3019	3/2$^-$	0	3/2$^+$	
3597		3597	9/2$^-$	0	3/2$^+$	
3883		3883	5/2$^-$	0	3/2$^+$	
3938		3939	3/2$^+$	0	3/2$^+$	
4082		4082	3/2$^-$	0	3/2$^+$	

† Rounded-off values from Adopted Gammas, unless otherwise noted.
‡ Absolute intensity per 100 decays.

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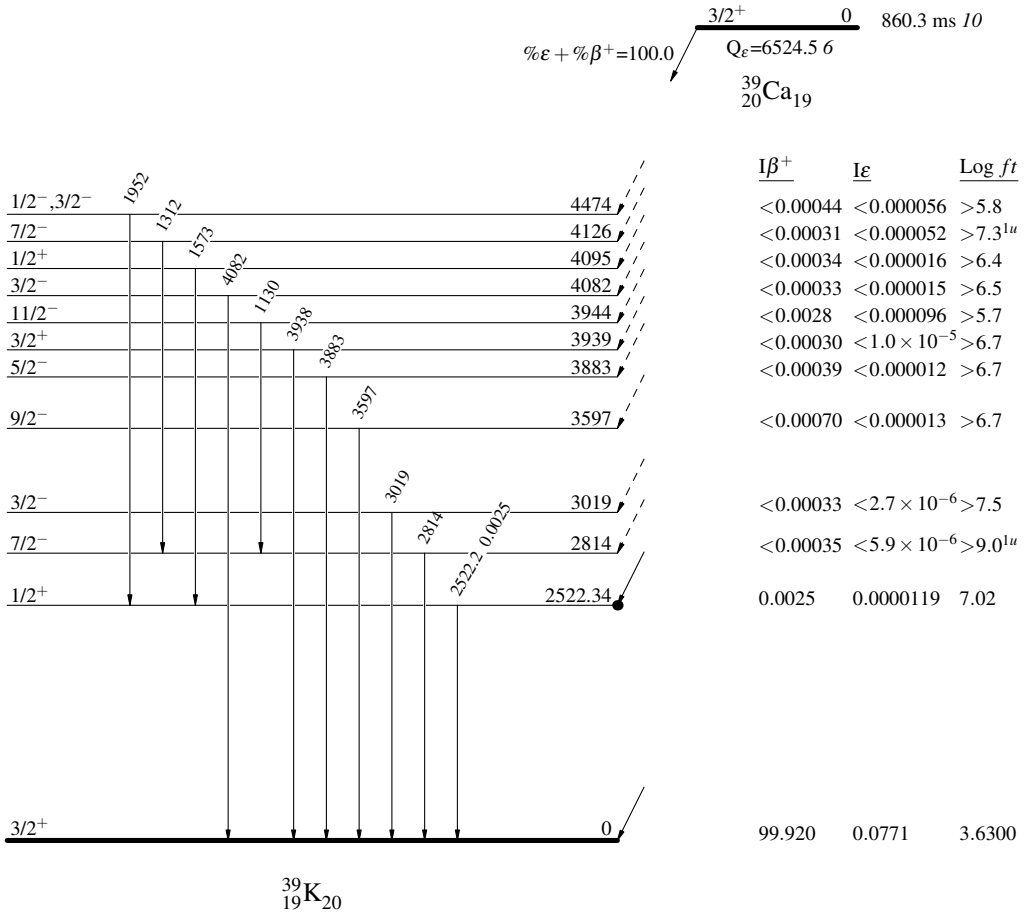
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



	Iβ+	Iε	Log *ft*
4474	<0.00044	<0.000056	>5.8
4126	<0.00031	<0.000052	>7.3[1u]
4095	<0.00034	<0.000016	>6.4
4082	<0.00033	<0.000015	>6.5
3944	<0.0028	<0.000096	>5.7
3939	<0.00030	$<1.0\times10^{-5}$	>6.7
3883	<0.00039	<0.000012	>6.7
3597	<0.00070	<0.000013	>6.7
3019	<0.00033	$<2.7\times10^{-6}$	>7.5
2814	<0.00035	$<5.9\times10^{-6}$	>9.0[1u]
2522.34	0.0025	0.0000119	7.02
0	99.920	0.0771	3.6300