^{36}Ca εp decay (100.9 ms)   1997Tr05,2001Lo11,2015Su01

Parent: ^{36}Ca: E=0; J$^{\pi}$=0$^+$; T$_{1/2}$=100.9 ms *20*; Q(εp)=9275 *6*; %εp decay=54.1 *12*

^{36}Ca-J$^{\pi}$: From the Adopted Levels of ^{36}Ca (2012Ni01).

^{36}Ca-T$_{1/2}$: Weighted average of 102 ms *2* (1995Tr02,1997Tr05), 100.1 ms *23* (2007Do17), and 100.0 ms *24* (2015Su01). Other:
    100 ms *+90−40* (1981Ay01).

^{36}Ca-Q(εp): Deduced by evaluators from ^{36}Ca mass excess of −6483 *6*; weighted average of −6483.6 *56* (2021Su04) and −6450 *40*
    (2021Wa16,1977Tr03), and ^{35}Ar mass excess of −23047.3 *7* (2021Wa16). Q(εp) from 2021Wa16: 9310 *40*.

^{36}Ca-%εp decay: Unweighted average of %ε+β^+p=56.8 *13* (1997Tr05), 54.3 *18* (2001Lo11), 51.2 *10* (2007Do17), and 53.9 *72*
    (2015Su01).

1997Tr05,1995Tr02: A-300 AMeV ^{40}Ca primary beam was produced by the GSI heavy-ion synchrotron. The secondary ^{36}Ca beam
    was produced via the projectile fragmentation of ^{40}Ca impinging on a ^{9}Be target and was selected using ΔE-tof-Bρ by FRS at
    GSI, Darmstadt. A total of 2.8×10^4 ^{36}Ca ions were implanted into a 500−μm-thick Si detector. ε+β^+-delayed protons were
    detected by the implantation detector. β particles were detected by the implantation detector and two 500−μm-thick Si counters. γ
    rays were detected by two Ge detectors. Measured E$_p$, I$_p$, Eγ, Iγ, βp-coin, $\beta\gamma$-coin, and pγ-coin. Deduced levels, decay
    branching ratios, log ft, B(F), and B(GT). Deduced parent ^{36}Ca T$_{1/2}$ from the time spectrum of proton events accumulated during
    the beam-off in the pulsed-beam mode. Comparisons with shell-model calculations.

2001Lo11: A 95-MeV ^{40}Ca primary beam was produced by the SISSI facility at GANIL. The secondary ^{36}Ca beam was produced
    via the projectile fragmentation of ^{40}Ca impinging on a natNi target and was selected usign ΔE-tof by the LISE3 spectrometer and
    purified by a velocity filter. A total of 102407 ^{36}Ca ions were implanted into a 500−μm-thick Si detector. ε+β^+-delayed protons
    were detected by the implantation detector. β particles were detected by two 500−μm-thick Si counters. γ rays were detected by
    three Ge detectors. Measured E$_p$, I$_p$, Eγ, Iγ, βp-coin, and $\beta\gamma$-coin. Deduced levels, decay branching ratios, log ft, B(F), and
    B(GT). Comparisons with shell-model calculations.

2015Su01: A 69.42-MeV/nucleon ^{40}Ca primary beam was produced by the Sector Focusing Cyclotron and Separated Sector
    Cyclotron at the Heavy Ion Research Facility in Lanzhou (HIRFL). The secondary ^{36}Ca beam was produced via the projectile
    fragmentation ^{40}Ca impinging on a ^{9}Be target and was selected using ΔE-tof-Bρ by RIBLL. A total of 22890 ^{36}Ca ions were
    implanted into a 525−μm-thick DSSD. ε+β^+-delayed protons were detected by the DSSD with a threshold of 500 keV.
    ε+β^+-delayed γ rays were detected by four Clover Ge detectors surrounding the DSSD chamber. Measured E$_p$, I$_p$, Eγ, Iγ,
    βp-coin, pγ-coin, and implant-decay time correlations. Deduced levels, decay branching ratios, and parent ^{36}Ca T$_{1/2}$. Also see
    2016Li45.

2007Do17: A 74.5-MeV/nucleon ^{58}Ni primary beam was produced by the SISSI facility at GANIL. The secondary ^{36}Ca beam was
    produced via the projectile fragmentation of ^{58}Ni impinging on a natNi target and was selected using ΔE-tof-Bρ by the
    ALPHA-LISE3 separator. A total of 16991 ^{36}Ca ions were implanted into a 500−μm thick DSSD. ε+β^+-delayed protons were
    detected by the DSSD with a threshold of 60-80 keV. ε+β^+-delayed γ rays were detected by four Ge detectors surrounding the
    implantation array. A 5-mm thick lithium-drifted Si detector was used as a veto for implantation events and to detect β particles.
    Measured E$_p$, I$_p$, and implant-decay time correlations. Deduced levels, decay branching ratios, and parent ^{36}Ca T$_{1/2}$.

1995Ga16: 60-keV ^{36}Ca was produced by the ISOLDE general-purpose on-line isotope separator at the CERN PS/Booster and
    implanted into the entrance window of a gas-Si-Si ΔE-E-veto detector telescope. Measured E$_p$. Deduced coeffcients of the isobaric
    multiplet mass equation for A=36, T=2 quintets. A by-product of ^{37}Ca decay study (1995Ga03).

1981Ay01,1980AyZZ: ^{36}Ca was produced via the ^{40}Ca(^{3}He,α3n) reaction using a 95-MeV ^{3}He beam from the 88-inch Cyclotron
    at Lawrence Berkeley Laboratory. β-delayed protons were detected using a Si surface barrier detector telescope with FWHM=55
    keV and a minimum threshold of ≈1.5 MeV. Measured E$_p$. Deduced ^{36}Ca T$_{1/2}$ and coeffcients of the isobaric multiplet mass
    equation for A=36, T=2 quintets.

Theoretical studies involving ^{36}Ca decay: shell model (1984Mu25,1990Br26), covariant density functional theory (2013Ni09).

^{35}Ar Levels

E(level)	J$^{\pi\dagger}$	Comments
0	3/2$^+$	
1184.3 *4*	1/2$^+$	E(level): from Eγ data in 1997Tr05 and 2001Lo11.

† From the Adopted Levels.

^{36}Ca εp decay (100.9 ms)　　　1997Tr05,2001Lo11,2015Su01 (continued)

$\gamma(^{35}$Ar)

E$_\gamma$	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
1184.3 4	1.2 4	1184.3	1/2$^+$	0	3/2$^+$	E$_\gamma$: weighted average of 1184.2 4 (1997Tr05) and 1185 1 (2001Lo11).

[†] Absolute intensity per 100 decays.

Delayed Protons (^{35}Ar)

E(p)[†]	E(^{35}Ar)	I(p)[#]	E(^{36}K)[‡]	Comments
1.37×10^3	1184.3	1.2 4	4281.7	E(p),I(p): from 1997Tr05. E(^{36}K): J$^\pi$=0, T=2 isobaric analog state in ^{36}K.
1648 18	0	8.4 12	3354	E(p): weighted average of 1676 39 (1997Tr05), 1645 21 (2001Lo11), 1660 18 (2007Do17), and 1624 22 (2015Su01). I(p): unweighted average of 11.3 6 (1997Tr05), 9.3 8 (2001Lo11), 7.3 8 (2007Do17), and 5.7 16 (2015Su01).
2549.9 22	0	37.4 10	4281.7	E(p): weighted average of 2519 21 (1981Ay01), 2550.2 22 (1995Ga16), 2548 37 (1997Tr05), 2551 21 (2001Lo11), 2538 18 (2007Do17), and 2594 30 (2015Su01). I(p): weighted average of 37.8 10 (1997Tr05), 32.1 42 (2007Do17), and 34.0 58 (2015Su01). Other: 37 1 (2001Lo11) without separating the weaker proton branch from the same level to ^{35}Ar first excited state. E(^{36}K): J$^\pi$=0, T=2 isobaric analog state in ^{36}K.
2713 21	0	2.6 9	4449	E(p): weighted average of 2713 31 (1997Tr05) and 2713 21 (2001Lo11). I(p): unweighted average of 1.7 2 (1997Tr05) and 3.5 5 (2001Lo11).
2921 35	0	1.3 2	4663	E(p): weighted average of 2937 35 (1997Tr05) and 2895 44 (2001Lo11). I(p): weighted average of 1.4 2 (1997Tr05) and 1.0 3 (2001Lo11).
3484 21	0	0.6 2	5242	E(p),I(p): from 2001Lo11.
3.98×10^3 7	0	0.9 2	5753	E(p),I(p): from 2001Lo11.
4.15×10^3 5	0	2.2 5	5927	E(p): weighted average of 4162 45 (1997Tr05) and 4135 44 (2001Lo11). I(p): unweighted average of 2.7 4 (1997Tr05) and 1.7 3 (2001Lo11).
4.99×10^3 7	0	0.4 2	6791	E(p): weighted average of 4989 69 (1997Tr05) and 4983 67 (2001Lo11). I(p): weighted average of 0.7 2 (1997Tr05) and 0.3 1 (2001Lo11).

[†] E(p)(lab). 2007Do17 and 2015Su01 only reported E$_{c.m.}$. 1997Tr05 and 2001Lo11 only reported the E(level) of ^{36}K proton-emitting levels. Evaluators deduced proton center-of-mass energies E$_{c.m.}$=E(level)(^{36}K)−S(p)(^{36}K)−E(level)(^{35}Ar) using their original S(p)=1666 8. Evaluators then deduced each E(p)(lab)=E$_{c.m.}$×m(^{35}Ar)/[m(p)+m(^{35}Ar)].

[‡] E(level)(^{36}K)=E(p)(lab)×[m(p)+m(^{35}Ar)]/m(^{35}Ar)+S(p)(^{36}K)+E(level)(^{35}Ar), where S(p)(^{36}K)=1658.9 8 (2021Wa16).

[#] Absolute intensity per 100 decays.

^{36}Ca εp decay (100.9 ms)   1997Tr05,2001Lo11,2015Su01

Decay Scheme

γ Intensities: I$_\gamma$ per 100 parent decays
I(p) Intensities: I(p) per 100 parent decays

E(p)	I(p)	E($^{36}_{19}$K)	E($^{35}_{18}$Ar)
1648	8.4	3354	0
2549.9	37.4	4281.7	0
2713	2.6	4449	0
2921	1.3	4663	0
3484	0.6	5242	0
3980	0.9	5753	0
4150	2.2	5927	0
4990	0.4	6791	0
1370	1.2	4281.7	1184.3

%εp=54.1

0^+ 0   100.9 ms 20

Q$_{\varepsilon p}$=9275 6

$^{36}_{20}$Ca$_{16}$

6791

5927
5753

5242

4663
4449
4281.7

3354

1184.3 1.20

$1/2^+$ 1184.3

$^{36}_{19}$K$_{17}$

$3/2^+$ 0

$^{35}_{18}$Ar$_{17}$