

Adopted Levels

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	12-Apr-2010

$Q(\beta^-)=1.38\times 10^4$ SY; $S(n)=1.0\times 10^3$ SY; $S(p)=2.21\times 10^4$ SY; $Q(\alpha)=-1.61\times 10^4$ SY [2012Wa38](#)

Note: Current evaluation has used the following Q record.

$\Delta Q(\beta^-)=1220$, $\Delta S(n)=1350$, $\Delta S(p)=1310$, $\Delta Q(\alpha)=1410$ (syst,[2009AuZZ](#),[2003Au03](#)).

$Q(\beta^-n)=10080$ 1220, $S(2n)=5150$ 1220 ([2009AuZZ](#),[2003Au03](#)).

$S(p)$ from [1997Mo25](#).

$Q(\beta^-)=13570$ SY; $S(n)=1750$ SY; $S(p)=21500$ CA; $Q(\alpha)=-14150$ SY [2009AuZZ](#),[2003Au03](#)

[2009Ta24](#), [2009Ta05](#): ^{57}Ca identified by fragmentation of ^{76}Ge beam at 132 MeV/nucleon at NSCL facility using A1900 fragment separator combined with S800 analysis beam line to form a two stage separator system. The transmitted fragments were analyzed event-by-event in momentum and particle identification. The nuclei of interest were stopped in eight Si diodes which provided measurement of energy loss, nuclear charge and total kinetic energy. The time-of-flight of each particle that reached the detector stack was measured in four different ways using plastic scintillators, Si detectors, and parallel-plate avalanche counters. The simultaneous measurement of ΔE signals, the magnetic rigidity, total kinetic energy and the time-of-flight (tof) provided unambiguous identification of the atomic number, charge state and mass number.

Theoretical calculations: [1998Br30](#) (levels, binding energy); [1995Ri05](#) (binding energy, mass defect); [1990Su06](#) (pygmy dipole resonances); [1976Da02](#) (mass excess); [2010Ta07](#) (calculated proton and neutron single-particle spectrum, neutron separation energies, rms charge radii).

 ^{57}Ca Levels

<u>E(level)</u>	<u>$T_{1/2}$</u>	<u>Comments</u>
0	>620 ns	$\% \beta^- = ?$; $\% \beta^- n = ?$; $\% \beta^- 2n = ?$ $\% \beta^- n = 22$, $\% \beta^- 2n = 1.8$ (calculated, 1997Mo25). Measured cross section= $47 \text{ fb } +34-23$ (e-mail reply of Nov 11, 2009 from O. Tarasov, first author of 2009Ta24). E(level): fragment observed by 2009Ta24 (also 2009Ta05) is assumed to correspond to the ground state of ^{57}Ca . J^π : $5/2^-$ proposed from systematics (2003Au02), $3/2^-$ from calculations (1997Mo25). $T_{1/2}$: time-of-flight=620-650 ns (e-mail reply of Sept 23, 2009 from O. Tarasov). Actual half-life is expected to be much longer as suggested by systematics value of 5 ms (2003Au02) and calculated value of 7.7 ms (1997Mo25). Calculated (1997Mo25) populations of daughter nuclides: 76% for ^{57}Sc , 22% for ^{56}Sc through $\beta^- n$ decay and 1.8% for ^{55}Sc through $\beta^- 2n$ decay.