Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	08-Sep-2023

Q(β^-)=1201×10[1] *36*; S(n)=293×10[1] *30*; S(p)=21270 *syst*; Q(α)=−14560 *syst* 2021Wa16
Estimated uncertainties (2021Wa16): 560 for S(p), 650 for Q(α).
Q(β^-n)=9260 *260*, S(2n)=4490 *250*, S(2p)=40650 *840* (syst) (2021Wa16).
Q(β^-2n)=4785 *250*, Q(β^-3n)=1046 *250* deduced by evaluator from relevant mass excesses in 2021Wa16.
1997Be70: ^{56}Ca identified in ^{9}Be(^{238}U,F), E=750 MeV/nucleon, fragments separator (FRS) at GSI facility, identification by time-of-flight. Measured production cross section.
2008Ma01: ^{56}Ca isotope produced in ^{9}Be(^{76}Ge,X) reaction at E=140 MeV/nucleon ^{76}Ge beam provided by NSCL at Michigan State University. Isotopes separated with A1900 fragment separator. Time-of-flight technique. Measured β particles using Beta Counting System of three Si PIN detectors, a double-sided silicon strip detector and six single sided silicon strip detectors. Detected γ rays using 16 Ge detectors of the Segmented Germanium array. Measured half-life of ^{56}Ca by fitting the decay curves to a function which included decay of the parent, growth and decay of daughter and a constant background. No gamma rays were seen in correlation with β rays.
2018Mi08: measured mass excess.

Theoretical structure calculations:
2023Kr01: calculated the nuclear ground state using relativistic Hartree-Bogoliubov model, and the M2 excitations using the relativistic QRPA with residual interaction.
2022Co05: calculated binding energies, isotope shifts, charge radii using independent particle model based on Hartree-Fock plus Bardeen−Cooper−Schrieffer (HF+BCS) approach.
2022Ko04: calculated ground state energies, charge rms radii using coupled cluster (CC) and ab-initio density functional theory.
2022Ku16: calculated potential energy surfaces, binding energy, S(2n), charge radius, neutron and proton rms radii, neutron skin thickness using covariant density functional theory with several Skyrme parametrizations.
2021Fu11: calculated energy levels, J^π, S(2n) using realistic shell model with chiral interaction.
2021Ma73: calculated levels, J^π, S(2n), two-body matrix elements (TBME) using state-of-the-art in-medium similarity renormalization group (IMSRG) interaction, with universal *fp* shell interaction.
2020Bh06: calculated energy levels, J^π, occupancy, B(E2), nuclear magnetic moments, spectroscopic factors, wave functions using shell model in several model spaces.
2020Co10: calculated energy of the first 2^+ state, S(2n) using shell model.
2020Li35: calculated binding energy, S(n), S(2n), neutron effective single-particle energies (ESPE), levels, J^π using realistic Gamow shell model.
2012Ha26: calculated ground state energy, J^π using chiral effective field theory.
2009Co19: calculated levels, J^π, neutron-neutron two-body matrix elements using shell-model with a realistic effective interaction from the CD-Bonn nucleon-nucleon potential.
1998Br30: calculated binding energy, levels, J^π using shell model plus Hartree-Fock approach.
Other theoretical structure calculations: 105 primary reference extracted from the NSR database are listed under 'document' records in this dataset.
Additional information 1.

^{56}Ca Levels

Cross Reference (XREF) Flags

A ^{1}H(^{57}Sc,2pγ)

E(level)	J^π	$T_{1/2}$	XREF	Comments
0	0^+	11 ms *2*	A	%β^-=100; %β^-n=?; %β^-2n=?; %β^-3n=? Theoretical $T_{1/2}$=24.2 ms, %β^-n=8, %β^-2n=0, %β^-3n=0 (2019Mo01). Theoretical $T_{1/2}$=14.2 ms, %β^-n=3.1, 2.8; %β^-2n=0.17, 0.18; %β^-3n=0 (2021Mi17); two

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{56}Ca Levels (continued)

E(level)	J^π	XREF	Comments
			values for different fission barriers. $T_{1/2}$: from (implants)β^- correlated decay curves (2008Ma01) using 18 β correlated events out of a total of 99 implantations of ^{56}Ca. Production cross section=1 nb (1997Be70) corresponding to three counts assigned to ^{56}Ca in ^{9}Be(^{76}Ge,X) reaction.
1456 *12*	(2^+)	A	Measured partial cross section for the 1456,(2^+) level=0.43 mb *4* (2023Ch26). E(level): from Eγ. J^π: from measured parallel momentum distributions, systematics of first 2^+ energies in even-even Ca nuclei, and shell-model calculations (2023Ch26).

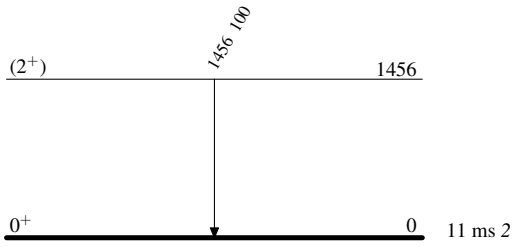
$\gamma(^{56}Ca)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
1456	(2^+)	1456 *12*	100	0	0^+	E_γ: from ^{1}H(^{57}Sc,2pγ).

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{56}_{20}Ca_{36}$