Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 190,1 (2023)	20-Jun-2023

Q(β^-)=−20880 *syst*; S(n)=19520 *syst*; S(p)=2790 *70*; Q(α)=−6850 *90* 2021Wa16

Estimated uncertainties (2021Wa16): 300 for Q(β^-), 210 for S(n).

S(2n)=36620 *300* (syst), S(2p)=2900 *50*, Q(εp)=8600 *50* (2021Wa16); Q(ε)=10382 *50* from newly measured mass of ^{44}V (M.E.=−23800.4 *71*) by 2022Wa39, compared to 10390 *50* from 2021Wa16.

1987Po04, 1992Bo37: ^{44}Cr produced and identified in Ni(^{58}Ni,X), E=55 MeV/nucleon; measured fragment spectra using LISE3 spectrometer at GANIL accelerator facility.

1994Bl10, 1996Fa09: ^{44}Cr produced in ^{9}Be(^{58}Ni,X), E=650 MeV/nucleon; measured fragment spectra using fragment separator at GSI accelerator facility.

2007Do17: Ni(^{58}Ni,X) E=74.5 MeV/nucleon ^{58}Ni beam was produced at GANIL. Target was 250 mg/cm^2 natural nickel. Fragments were selected by the ALPHA-LISE3 separator, identified with two micro-channel place (MCP) detectors and a setup consisting of silicon and Ge detectors by time of flight and energy loss, and implanted into double-sided silicon strip detectors (DSSSD). Measured E(p), I(p), implant-decay correlations. Deduced ^{44}Cr $T_{1/2}$, proton-emission probability.

2014Po05: Ni(^{58}Ni,X) E=160 MeV/nucleon ^{58}Ni beam was produced at National Superconducting Cyclotron Laboratory. Target was 580 mg/cm^2 thick natural nickel. Products were selected by the A1900 fragment separator and identified by time of flight and energy loss information then slowed in an aluminum foil and stopped in the active volume of the optical time-projection chamber (OTPC) which was filled with a mixture of He, Ar, and N gases and used to track charged particles. Measured reaction products, half-life, E(p), production σ, proton energy distribution. See also 2012Po03.

Mass measurement: 2020Fu05: measured mass excess of g.s. using RIBBL2 separator at CSRe-HIRFL, Lanzhou.

^{44}Cr decays to ^{43}Ti by εp and/or β^+p decay.

Theoretical structure calculations:

2022Ko04: calculated ground state energy, charge rms radius using Coupled cluster (CC) and ab initio density functional theory.

2021Pe14: calculated potential energy curves as function of deformation parameter β_2 using constrained axial RHB calculations with several covariant energy density functionals.

2019Mi22: calculated binding energy and lowest isobaric analog 0^+, T=0 to 3 excited stats, staggering amplitudes for the total energy, total isovector pairing gaps using shell-model Hamiltonian.

2017De15: calculated energies of 1^-, 2^+ and 3^- levels, B(E2) for the first 2^+ state, B(M1) values of 1^+ states using HF+BCS+QRPA and QRPA(F) with finite−range interactions of Gogny type.

2016Me02: calculated B(E2) for the first 2^+ state using shell model with KB3G interaction.

2012Ca30: calculated energy levels, J^π, electric quadrupole and magnetic dipole moments using shell model with FPD6 and GXPF1 interactions.

2011Ma08: calculated energy surfaces, quadrupole moments, pairing gaps using Hartree-Fock-Bogoliubov method using GXPF1A effective interaction.

2005Pa26: calculated electric dipole strength distributions, pygmy resonance features using Self-consistent relativistic Hartree-Bogoliubov model, relativistic quasiparticle RPA.

2004Sv04: calculated level energies of isobaric analog 0^+ states using algebraic shell model.

2002Ca48: calculated level energies, B(E2) using large-scale shell model.

1989Ab13: calculated levels, B(λ), β-decay log *ft* using shell model wave functions, and boson analysis.

Other theoretical calculations: 28 references for nuclear structure and five for radioactive decays retrieved from the NSR database (www.nndc.bnl.gov/nsr/) are listed in document records which can be accessed via web-based ENSDF database.

Additional information 1.

^{44}Cr Levels

E(level)	J^π	$T_{1/2}$	Comments
0	0^+	42.8 ms *6*	%ε+%β^+=100; %εp=12 *2* $T_{1/2}$: from decay-time distribution in 2007Do17. Others: 25 ms *+6−4* (2014Po05, 2012Po03), 53 ms *+4−3* (1992Bo37). Weighted average of the three values is 43 ms *5*, with a large reduced χ^2=10.4; unweighted average is 40 ms *8*. 2016Fu02 (also 2013Fu08) report $T_{1/2}$=40 ms *5*, estimated from

Continued on next page (footnotes at end of table)

Adopted Levels (continued)

^{44}Cr Levels (continued)

E(level)	J^{π}	$T_{1/2}$	Comments
			measured B(GT) values in the ^{44}Ca(^{3}He,t)^{44}Sc reaction with the assumption of isospin symmetry. %εp from unweighted average of 10 *1* (2014Po05) and 14.9 *9* (2007Do17). Other: >7 *3* (1996Fa09).