Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 188,1 (2023)	17-Jan-2023

Q(β^-)=−14040 *syst*; S(n)=13300 *syst*; S(p)=2.19×10^3 *13*; Q(α)=−2.17×10^3 *15* 2021Wa16
ΔQ(β^-)=420, ΔS(n)=240 (syst,2021Wa16).
S(2n)=30330 *330* (syst), S(2p)=4470 *130*, Q(εp)=8310 *130*, Q(ε)=10180 *130* (2021Wa16).
Mass measurement: 2011Tu02, HIRFL-CSR, Cooler Storage Ring at the Heavy Ion Research Facility in Lanzhou.
Additional information 1.
1981Ew01: ^{71}Kr produced and identified in ^{93}Nb(p,X) at 1 GeV, chemical mass separation, measured half-life.
1995Bl23: fragmentation of ^{78}Kr beam at 73 MeV/nucleon with a carbon target. SISSI/LISE spectrometer at GANIL. Energy loss and time-of-flight techniques.
1997Oi01: ^{93}Nb(p,X) at 1 GeV, ISOLDE-CERN facility, measured γ, β, delayed protons, coincidences between different types of radiation.
2002Lo13 (also 2002Bl17): fragmentation of ^{78}Kr beam at 73 MeV/nucleon with a carbon target. SISSI/LISE spectrometer at GANIL. Energy loss and time-of-flight techniques.
2008NaZR: Ca(^{32}S,X) and Ca(^{33}S,X), recoil-β^+ decay tagging method to identify γ rays in ^{71}Kr. The details are not available.
2014Ro14: ^{71}Kr produced in the fragmentation of 70 MeV/nucleon ^{78}Kr beam with nickel target. Fragments selected with the LISE3 separator at GANIL and identified by time-of-flight and energy loss. Measured half-life of ^{71}Kr ground-state decay by (fragment)β, (fragment)γ correlations using four Si detectors (an energy loss ΔE detector, a degrade, DSSD and Si(Li)) for particles surrounded by four HPGe Clover detectors, three EXOGAM, and one mini-clover Ge detector for γ rays.
2018Wi08: intense production (see Fig. 1 in the paper) of beam of ^{71}Kr nuclei in ^{9}Be(^{78}Kr,X),E-345 MeV/nucleon at RIBF-RIKEN.
2019Si33: ^{71}Kr produced at the RIBF-RIKEN facility in the ^{9}Be(^{124}Xe,X) reaction at E=345 MeV/nucleon. Fragments were separated in the first stage of BigRIPS and then identified by measuring ΔE, tof and Bρ using BigRIPS and the ZeroDegree spectrometer, followed by implantation of products into the beta-counting system WAS3ABi, consisting of a double-sided silicon-strip detector. Measured time distribution of (implanted ions)β^+-correlated events, and deduced half-life of ^{71}Kr decay.
2022Wa34: ^{71}Kr produced in ^{9}Be(^{92}Mo,X),E=140 MeV/nucleon reaction, followed by separation of ions of interest using A1900 fragment separator and a Radio Frequency Fragment Separator (RFFS) at the Coupled Cyclotron Facility of NSCL-MSU. The ions in the cocktail beam were implanted into the β-counting station (BCS), which consisted of a stack of PIN detector (PIN2) and Double-Sided Silicon-Strip Detector (DSSSD) for detection of implants, surrounded by the SeGA array of 16 HPGe detectors for γ detection. Measured Eγ, Iγ, (implants)β-coin, (implants)(β-delayed protons)-coin, (implants)$\gamma\gamma$-coin, (implants)$\beta\gamma$-coin, $T_{1/2}$ of decay of ^{71}Kr. Deduced absolute (per 100 decays of parent) number of $\beta\gamma$-coin events, β events, absolute (per 100 decays of parent) intensities of γ rays, and intensities of β-delayed protons.
1964Fl03: $^{70-72}$Br or $^{70-72}$Kr claimed to have been produced in Ni(^{20}Ne,X) E=140 MeV reaction and a delayed proton group of 2.5 MeV with a half-life of 23 s *4*. It is not possible to associate this observation with a presently known activity.
Theoretical structure calculations:
2012Bh10: calculated S(2n), β_2, S(p), binding energy using microscopic-macroscopic model with Wigner-Kirkwood expansion.
2001Sa67: calculated Gamow-Teller strength distributions, Q(ε), $T_{1/2}$, deformation, using self-consistent Hartree-Fock approach.
1998Ur03: calculated levels, J^π, Gamow-Teller strengths using Hartree-Fock approach.
1972Di03: calculated potential energy surface, deformation energy using Strutinsky formalism.

^{71}Kr Levels

E(level)	J^π	$T_{1/2}$	Comments
0	(5/2)$^-$	94.9 ms *4*	%ε+%β^+=100; %εp=3.06 *27* (2022Wa34) %εp=3.06 *27* (2022Wa34, measurement of β-delayed proton spectrum correlated with implants, Monte-Carlo analysis used for separation of charged particles into positron and protons). Others: %εp=2.1 *7* (1997Oi01), 5.2 *6* (1995Bl23). Due to much higher statistics and a refined analysis in 2022Wa34, value from this work is preferred over those from 1997Oi01 and 1995Bl23. J^π: log *ft*=3.64 to (5/2)$^-$ g.s. of ^{71}Br; mirror partner of ^{71}Br, g.s. J^π=(5/2)$^-$ (see 2022Wa34 and 2005Fi10 for discussion). Possible $\nu f_{5/2}$ configuration.

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Adopted Levels (continued)

^{71}Kr Levels (continued)

E(level)	J^{π}	$T_{1/2}$	Comments
			$T_{1/2}$: 94.9 ms *4* (2022Wa34, (implants)(decay events)-correlated decay curve, with a constant background; authors also measured $T_{1/2}$=95.3 ms *22* from (implants)$\beta\gamma$-correlated decay curve; the uncertainty includes statistical as well as systematic). Others: 98.8 ms *3* (2019Si33, (implanted ions)(β^+)-decay curve, with exponential fit to the decay curve, including contributions from the decays of parent, daughter and grand-daughter activities and a constant background, however no decay curve is in the paper); 92 ms *9* (2014Ro14, β^+ decay correlation spectrum); 83 ms *48* (2002Lo13); 100 ms *3* (1997Oi01); 64 ms *+8−5* (1995Bl23); 97 ms *9* (1981Ew01). Weighted average of all the measured values listed above, except that from 1995Bl23, is 97.4 ms *8*, but with reduced χ^2=10.5 as compared to 2.1 at 95% confidence level; unweighted average is 94.4 ms *22*.