Adopted Levels

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	31-Mar-2017

Q(β^-)=9751 *7*; S(n)=5090 *6*; S(p)=13187 *7*; Q(α)=−11800 *SY* 2017Wa10
Estimated ΔQ(α)=300 (2017Wa10).
S(2n)=12366 *6*, S(2p)=30390 *400* (syst), Q(β^-n)=1516 *6* (2017Wa10).
^{74}Cu identified by thermal neutron fission of ^{235}U: 1987Ar21, 1987LuZX, 1989Wi11, 1990Be13, 1991Kr15, 1992CzZY. 1997Hu09, 2002Kr10, 2002Kr13: ^{74}Cu produced in ^{238}U(p,F) E=30 MeV. Measured yields.
1987LuZX: measured $T_{1/2}$.
1991Kr15: measured $T_{1/2}$ and neutron-emission probabilities.
1999GrZQ: search for microsecond isomers in Ni(^{86}Kr,X) reaction.
2010Fl02, 2010Vi07: measurement of spin, static magnetic and quadrupole moments by collinear laser spectroscopy at the CERN-ISOLDE facility. ^{74}Cu produced in bombardment of uranium carbide target with 1.4 GeV protons. Resonant ionization laser ion source (RILIS) was used to resonantly laser ionize the Cu atoms. The ions were accelerated to 30 keV and mass separated by HRS and injected into radiofrequency quadrupolar (RFQ) gas-filled Paul trap (ISCOOL). Measured hyperfine structure for the ground state from resonance fluorescence spectra; deduced spin, magnetic dipole moment and electric quadrupole moment. The data were normalized to values of hyperfine structure constants, and moments for ^{65}Cu. Comparison with shell-model calculations.
2016Bi08: ^{74}Cu isotope was produced by bombarding UC_x target with 1.4 GeV proton beam at the CERN-ISOLDE facility. Cu isotopes were selectively ionized by the RILIS laser ion source, accelerated to 30 keV, mass separated with the high-resolution mass separator, and injected into the gas-filled linear Paul trap. Measured isotope shift with respect to ^{65}Cu using the collinear laser spectroscopy setup. Studied systematics of isotope shifts on $^{58-75}$Cu isotopes. Compared with droplet model predictions.
No excited states are known from ^{74}Ni β^- decay. In the fragmentation of ^{86}Kr beam with a Ni target, 1999GrZQ claimed to have observed short-lived isomer(s) in ^{74}Cu, but no details are available as to the excitation energies.
^{75}Ni decays by β^-n to ^{74}Cu with %β^-n=10.0 *28* (2010Ho12). Other %β^-n=1.6 (1985Re01). No details of the level population from this decay are available.
In $\beta\gamma$ and $\gamma\gamma$ studies of ^{74}Cu decay, 1998Fr15 reported two most intense γ rays at 166.1 *1* and 694.3 *2*, forming a cascade. These γ rays feed levels either in ^{74}Cu through ^{74}Ni β^- decay or in ^{73}Cu through ^{74}Ni β^-n decay. The latter possibility, however, seems less likely (1998Fr15) since the γ-ray intensities imply %β^-n=30, much higher than the theoretical value of 2.3% (2003Mo09).
Mass measurements: 2005Gu36, 2007Gu09.
Additional information 1.

^{74}Cu Levels

Cross Reference (XREF) Flags

A ^{74}Ni β^- decay (507.7 ms)

E(level)	J$^\pi$	$T_{1/2}$	XREF	Comments
0.0	2$^-$	1.63 s *5*	A	%β^-=100; %β^-n>0 μ=−1.068 *3* (2010Fl02,2010Vi07,2014StZZ) Q=+0.27 *3* (2010Fl02,2010Vi07,2016St14) δ<r^2>(^{65}Cu,^{74}Cu)=0.505 fm^2 *18*(stat) *72*(syst) (2016Bi08). The systematic uncertainty for isotope shift resulted from uncertainties in the atomic factors. %β^-n: 1991Kr15 claim to have observed delayed neutrons from ^{74}Cu decay, but %β^-n is not determined in this work. J$^\pi$: from collinear laser spectroscopy (2010Fl02); parity from comparison of measured μ and Q moments with shell-model model predictions. Calculated magnetic moment is positive for all the calculated 2$^+$ states up to about 800 keV in these model predictions. Best agreement of experimental μ and Q with calculated moments is obtained for a predicted 2$^-$ state at 208 keV using jj44b interaction and for a predicted 2$^-$ state at 44 keV using JUN45 interaction. Dominant configuration=$\pi f_{5/2}\otimes\nu g_{9/2}$.

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Adopted Levels (continued)

^{74}Cu Levels (continued)

E(level)	J^{π}	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: weighted average of 1.75 s *6* (2005Va19, timing of γ rays), 1.594 s *10* (1991Kr15, timing of delayed neutrons), 1.59 s *5* (1989Wi11, timing of γ rays). Uncertainty of 0.010 s given by 1991Kr15 increased by a factor of 5 in the averaging procedure. Others: 1.51 s *27* (1990Be13), 1.60 s *15* (1987LuZX). μ,Q: from hyperfine structure measurements using collinear laser spectroscopy (2010Fl02,2010Vi07). Value of Q=+0.26 *3* in 2010Fl02 is re-evaluated to +0.27 *3* by 2016St14.