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^-)=12440 *syst*; S(n)=3110 *syst*; S(p)=18770 *syst*; Q(α)=−15090 *syst* 2021Wa16

Estimated uncertainties (2021Wa16): 610 for Q(β^-), 500 for S(n), 640 for S(p), 570 for Q(α).

S(2n)=8870 *450*, S(2p)=36880 *640*, Q(β^-n)=6520 *400* (syst, 2021Wa16). Q(β^-2n)=2318 *410* (deduced by evaluators from mass values in 2021Wa16).

1997Be70: ^{71}Fe produced and identified in ^{9}Be(^{238}U,X) reaction at 750 MeV/nucleon followed by mass separation in a magnetic spectrometer, time-of-flight and energy loss measurements. Measured production cross section.

Additional information 1.

2002MaZN (thesis): ^{71}Fe produced in fragmentation of ^{86}Kr beam at 57.8 MeV/nucleon at GANIL facility, LISE 2000 fragment separator, time-of-flight method, EXOGAM array for γ-ray detection. Measured β, isotopic half-life.

2011Da08 (also 2002MaZN thesis): ^{71}Fe produced in the fragmentation of 57.8 MeV/nucleon ^{86}Kr beam impinged on 50 mg/cm^2 thick tantalum target using LISE-2000 spectrometer at GANIL facility. Detector system included a three-element Si-detector telescope containing a double-sided silicon-strip detector (DSSSD) backed by a Si(Li) detector and surrounded by four clover type EXOGAM Ge detectors. Products identified by mass, atomic number, charge, energy loss and time of flight. Measured half-life from (implants)β correlated events.

2013Ma87: ^{71}Fe produced in ^{9}Be(^{86}Kr,X), E(^{86}Kr)=140 MeV/nucleon reaction at the NSCL-MSU facility. Target: 440 mg/cm^2 ^{9}Be. Neutron rich Fe isotopes were separated using A1900 fragment separator. Detected β and γ radiation by NSCL beta counting system. Measured time-of-flight and energy loss for identification of isotope. SeGA array was used for γ counting. Measured half-life by time distribution of β particles detected correlation with implanted ^{71}Fe ions. The $\beta\gamma$-coincidence events in correlation with ^{71}Fe implants were also detected, but the statistics were very low. Comparison with FRDM+QRPA and Df3a++CQRPA theoretical calculations.

2014XuZZ (thesis): ^{71}Fe produced in ^{9}Be(^{238}U,F), E=345 MeV/nucleon, and separated using BigRIPS and ZeroDegree spectrometers at RIBF-RIKEN facility, followed by β and γ counting using EURICA array for γ rays. Measured half-life of decay of ^{71}Fe by (^{71}Fe implants)β-correlated events, and by β(215.5γ)-coin decay curve. According to Fig. 3.7 showing a plot of yields of different isotopes, a large number of events were assigned to ^{71}Fe.

2015BeZR: ^{71}Fe produced in ^{9}Be(^{238}U,F),E=345 MeV/nucleon, and separated using BigRIPS and ZeroDegree spectrometers at RIBF-RIKEN facility, followed by β and γ counting. A total of 26346 implants of ^{71}Fe were recorded.

Theoretical calculations: 2010Af01: calculated impact of nuclear magnetism (NM) on binding energies, quadrupole deformation, total neutron current distributions, neutron and proton dependencies of additional binding energies, and energy splittings between signature of single-particle states using NL3 parametrization of relativistic mean field (RMF) Lagrangian.

^{71}Fe Levels

E(level)	$T_{1/2}$	Comments
0	35.7 ms *20*	%β^-=100; %β^-n=?; %β^-2n=? The β^- decay mode has been detected, and it is the only decay possible, thus 100% β^- is assigned. Theoretical $T_{1/2}$=69.8 ms, %β^-n=16, %β^-2n=0 (2019Mo01). Theoretical $T_{1/2}$=48.6 ms, %β^-n=4.2, 4.6; %β^-2n=0.16, 0.23 (2021Mi17). $T_{1/2}$: from weighted average of 34.7 ms *36* (2014XuZZ, time distribution of β(215.5γ)-coin events); 36.6 ms *20* (2014XuZZ, time distribution of β(^{71}Fe implants), where fitting involved half-lives of β and β^-n daughters, and respective grand daughters, together with theoretically estimated %β^-n values; from Fig. 3.7 in this work it appears that a larger number of ^{71}Fe nuclei were detected); 42 ms *6* (2013Ma87, time distribution of β(^{71}Fe implants)-correlated events, with 184 implants); and 28 ms *5* (2011Da08, 2002MaZN, (implants)β-correlated events, fitting procedure included five parameters: β-detection efficiency, background rate, mother, daughter and grand-daughter half-lives). J^π: 7/2$^+$ from systematics (2021Ko07); Ω_n=5/2$^+$ orbital (2019Mo01, theory).