Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Jagdish K. Tuli, and Edgardo Browne	NDS 185, 560 (2022)	31-Aug-2022

Q(β^-)=3864 *14*; S(n)=5478 *10*; S(p)=7380 *SY*; Q(α)=2230 *SY* 2021Wa16
Estimated uncertainties (2021Wa16): 200 keV for S(p), 300 keV for Q(α).
S(2n)=9730 *9*, S(2p)=17390 *400* (syst) (2021Wa16).
1985Hi02: ^{231}Fr produced and identified in ^{238}U(p,X),E=600 MeV reaction. Measured γ- and x-ray spectra, $T_{1/2}$.
2001Fr05: ^{231}Fr was produced by spallation of 1 GeV proton beam on uranium targets. The activity was mass-separated at CERN ISOLDE on-line separator, deposited on a magnetic tape, and then radiations were counted at two stations.
2014Bu06: ^{231}Fr produced in 1.4-GeV proton bombardment of UC_x target using HRS mass separator, ISCOOL gas-filled segmented linear Paul trap, and RILIS at ISOLDE-CERN facility. Measured hyperfine spectra, magnetic dipole moments and rms charge radii by Collinear Resonance Ionization Spectroscopy (CRIS).
Measured atomic masses: 2014Kr09, 2012Ch19 (also 2008ChZI thesis).
Theoretical nuclear structure calculations: consult NSR database (www.nndc.bnl.gov/nsr/) for two primary references, also listed in 'document records' in this dataset, which can be accessed through on-line ENSDF database at www.nndc.bnl.gov/ensdf/.
Additional information 1.

^{231}Fr Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	$(1/2^+)$	17.6 s *6*	%β^-=100 μ=+1.56 *2* (2014Bu06) δ<r^2>(^{231}Fr,^{221}Fr)=+1.078 fm^2 *12* (2014Bu06). Isotope shift $\delta\nu$(^{231}Fr,^{221}Fr)=−22.14 GHz *10* (2014Bu06). μ: measured by 2014Bu06, Collinear Resonance Ionization Spectroscopy. Spectroscopic magnetic dipole moment is not listed in 2019StZV evaluation. J^π: Nilsson orbital assignment of π1/2[400] is based on a characteristic β^- decay pattern between the 1/2[400] and 1/2[501] configurations from ^{227}Fr to ^{227}Ra, ^{229}Fr to ^{229}Ra, ^{231}Fr to ^{231}Ra, ^{231}Ac to ^{231}Th, ^{233}Ac to ^{233}Th, and ^{237}Pa to ^{237}U. In each case, the daughter level decays by two strong E1 γ-ray transitions. $T_{1/2}$: from γ and x-ray decay curves, weighted average of 17.7 s *6* (2001Fr05) and 17.5 s *8* (1985Hi02).