Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Sukhjeet Singh	ENSDF	08-Mar-2022

Q(β^-)=2923 *11*; S(n)=4705 *11*; S(p)=5930 *14*; Q(α)=4948 *18* 2021Wa16
S(2n)=10772 *13*, S(2p)=13782 *19* (2021Wa16).
1981Ku02, 1969Ha03: ^{224}Fr produced and identified in Th(p,X),E=600 MeV at ISOLDE-CERN facility. Measured β and γ radiation, half-life.
1964Bu02: searched for ^{224}Fr activity but no evidence was found, authors estimated half-life to be <2 min.
2014Kr09: mass determination with Penning-trap mass spectrometer ISOLTRAP facility at ISOLDE, CERN. Measured mass excess=21748 *12*.
2012Ch19 (also 2008ChZI): precise mass measurement by Schottky Mass Spectrometry.

Theoretical calculations: 11 references extracted from the NSR database are listed in document records.
Additional information 1.
A 4.27 MeV *4* α group has been assigned to the decay of ^{228}Ac with branching=5.5×10^{-8} *22* per ^{228}Ac decay in a chemically separated source (1969Lu12). This group would feed a level at 330 keV *42* in ^{224}Fr. However, such a group would have an unreasonably low α hindrance factor, HF=4×10^{-4}. Therefore, the assignment of this α group to the decay of ^{228}Ac is considered as questionable by evaluators.
Ten γ rays have been observed (1979Va20) in the decay of ^{224}Rn, and are listed in the table, but no decay scheme has been proposed as yet. Evaluators note that a 202.21γ and 63.55γ cascade with 265.76γ as a crossover transition is suggested by 202.21 *5* + 63.55 *10*=265.76 *11* consistent with observed γ of 265.806 keV *17*. Also, almost equal intensities of 260.581γ and 265.806γ suggest a cascade of these two gamma rays.

^{224}Fr Levels

Cross Reference (XREF) Flags

A ^{224}Rn β^- decay (107 min)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	1$^{(-)}$	3.33 min *10*	A	%β^-=100 μ=+0.40 *1* (1985Co24,2019StZV) Q=+0.523 *9* (1985Co24,2021StZZ) Evaluated RMS charge radius=5.706 fm *18* (2013An02). J$^\pi$: spin from atomic beam laser spectroscopy (1985Co24); π from agreement of experimental and theoretical magnetic dipole and electric quadrupole moments based on configuration=π3/2⊗ν1/2 (1986Ek02). T$_{1/2}$: from γ decay curve (1981Ku02). Others: 2.67 min *20* from β decay curve (1969Ha03), <2 min (1964Bu02, activity not seen). Value from γ decay is preferred here due to better selectivity. No decay curves or other details of T$_{1/2}$ measurements done at ISOLDE-CERN facility are given in 1981Ku02 and 1969Ha03. μ,Q: atomic-beam laser spectroscopy (1985Co24). Measured δ<r^2>=1.28937 *4* relative to ^{212}Fr (1987Co19) (correction of earlier value of 0.52269 *2* quoted in 1985Co24). Other: 1.487 *15* (2005Dz02).