^{54}Mn ε decay 1993Da20,1966Ha07,1990KuZJ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde	NDS 121, 1 (2014)	20-Jun-2014

Parent: ^{54}Mn: E=0.0; $J^\pi=3^+$; $T_{1/2}$=312.20 d *20*; Q(ε)=1377.2 *10*; %ε+%$β^+$ decay=100.0

^{54}Mn-$T_{1/2}$: From Adopted Levels.

Additional information 1.

1971He20: five different Ge(Li) systems, precise comparison and measurement.

1966Ha07: produced by ^{54}Fe(n,p). Chemical separation. Double focusing spectrometer, internal-external conversion method.

1990KuZJ: reported Eγ and Σ I(K x ray)=25.7% 3.

1991BaZS: E(Kα x ray)=5.41 (22.6% 7); E(Kβ x ray)=5.95 (3.0% 1); I(K x ray)=25.6% 8.

1994Ma13: E(Kα x ray)=5.41 (22.00%); E(Kβ x ray)=5.95 (2.47%); I(835γ)=100%.

1994Le29: I(Kβ x ray)/I(Kα x ray)=0.1332 *16*.

See also 1958Ka34.

1993Da20: a limit of 5.7×10^{-7} % has been established for the $β^+$ branch of ^{54}Mn $β^+$ decay.

2006Da20: ^{54}Mn source from ptb (Germany), measured Eγ, Iγ. The 835-keV g-ray emission probability was obtained using a coaxial germanium detector, half-life of ^{54}Mn was determined by reference source method using a HPGe detector: 312.1 d 9.

2008AdZX: 10 UCi ^{54}Mn source, measured Eγ, Iγ with 100% Ge detector, obtained half-life of ^{54}Mn: 311.12 d *82*.

The probability per K capture for double K-shell ionization in ε decay p(K)=3.6×10^{-4} *3* (1984Na25), P(K)=2.3×10^{-4} *+8−5* (2003Hi07), see 1985In02 for theoretical computation.

Other: see 1978Ve02.

^{54}Cr Levels

E(level)	J^π
0.0	0^+
834.848 *3*	2^+

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(542.4 *10*)	834.848		100.0	6.2	100.0	εK= 0.8895; εL= 0.09416; εM+= 0.01635
(1377.2 *10*)	0.0	$<5.7\times10^{-7}$	$<3.6\times10^{-4}$	>14.1 *2u*	$<3.6\times10^{-4}$	$Iβ^+$: from 1993Da20.

† Absolute intensity per 100 decays.

γ(^{54}Cr)

Iγ normalization: From I(ε)=I(γ+ce)(835γ)=100.

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α‡	$I_{(\gamma+ce)}$†	Comments
834.848 *3*	99.976 *1*	834.848	2^+	0.0	0^+	E2	2.40×10^{-4}	100	α(K)exp=0.000224 *10* (1966Ha07) K/L+M=8.5 *7* (1958Ka34); emission probability: 0.9997 *55* (2006Da20). E_γ: from 1990KuZJ.

† Absolute intensity per 100 decays.

‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^{54}Mn ε decay 1993Da20,1966Ha07,1990KuZJ

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays