

^{54}Mn ε decay [1993Da20,1966Ha07,1990KuZJ](#)

Type	Author	History	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; $Q(\varepsilon)=1377.2$ 10; $\% \varepsilon + \% \beta^+$ 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 $^{54}\text{Fe}(n,p)$. Chemical separation. Double focusing spectrometer, internal-external conversion method.

[1990KuZJ](#): reported E_γ and $\Sigma I(K \text{ x ray})=25.7\%$ 3.

[1991BaZS](#): $E(K\alpha \text{ x ray})=5.41$ (22.6% 7); $E(K\beta \text{ x ray})=5.95$ (3.0% 1); $I(K \text{ x ray})=25.6\%$ 8.

[1994Ma13](#): $E(K\alpha \text{ x ray})=5.41$ (22.00%); $E(K\beta \text{ x ray})=5.95$ (2.47%); $I(835\gamma)=100\%$.

[1994Le29](#): $I(K\beta \text{ x ray})/I(K\alpha \text{ x ray})=0.1332$ 16.

See also [1958Ka34](#).

[1993Da20](#): a limit of $5.7 \times 10^{-7} \%$ has been established for the β^+ branch of ^{54}Mn β^+ decay.

[2006Da20](#): ^{54}Mn source from ptb (Germany), measured E_γ , I_γ . 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 E_γ , I_γ 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 $p(K)=3.6 \times 10^{-4}$ 3 ([1984Na25](#)), $P(K)=2.3 \times 10^{-4} + 8-5$ ([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)	$I\beta^+^\dagger$	$I\varepsilon^\dagger$	Log ft	$I(\varepsilon + \beta^+)^\dagger$	Comments
(542.4 10)	834.848		100.0	6.2	100.0	$\varepsilon K=$ 0.8895; $\varepsilon L=$ 0.09416; $\varepsilon M+=$ 0.01635
(1377.2 10)	0.0	$<5.7 \times 10^{-7}$	$<3.6 \times 10^{-4}$	$>14.1^{2u}$	$<3.6 \times 10^{-4}$	$I\beta^+$: from 1993Da20 .

† Absolute intensity per 100 decays.

 $\gamma(^{54}\text{Cr})$

I_γ normalization: From $I(\varepsilon)=I(\gamma+ce)(835\gamma)=100$.

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	α^\ddagger	$I_{(\gamma+ce)}^\dagger$	Comments
834.848 3	99.976 1	834.848	2^+	0.0	0^+	E2	2.40×10^{-4}	100	$\alpha(K)\text{exp}=0.000224$ 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 multiplicities, and mixing ratios, unless otherwise specified.

⁵⁴Mn ε decay 1993Da20,1966Ha07,1990KuZJ

Decay Scheme

Intensities: I_(γ+ce) per 100 parent decays

