⁵⁰Mn ε decay (283.19 ms) 1994Ha43,2009Ha12

	Hist	ory	
Туре	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 157, 1 (2019)	15-Apr-2019

Parent: ⁵⁰Mn: E=0.0; $J^{\pi}=0^+$; $T_{1/2}=283.19$ ms *10*; $Q(\varepsilon)=7634.48$ 7; $\%\varepsilon+\%\beta^+$ decay=100.0 ⁵⁰Mn-Q(ε): From 2017Wa10.

 50 Mn-T_{1/2}: From 50 Mn Adopted Levels.

1994Ha43: ⁵⁰Mn source was produced in (p,n) reaction at the TASCC facility. Measured $E\gamma$, $I\gamma$, $\gamma(t)$, with a HPGe detector tagged by positron events measured by two thin plastic scintillators. See also 1993HaZT.

Several theoretical and systematic studies, e.g. 2009Ha12, have been made on the super-allowed β decay of ⁵⁰Mn g.s. and isospin states. Consult Nuclear Science References (NSR) database for these.

1965Fr08: measured half-life, and deduced log ft value for the decay to the g.s. of ⁵⁰Cr.

⁵⁰Cr Levels

E(level)	J^{π}	Comments
0	0^{+}	
783	2^{+}	
3628	1^{+}	
3827?	0^{+}	J^{π} : suggested as a candidate for second 0 ⁺ state (1994Ha43).
4998	$1^{(+)}$	J^{π} : from log <i>ft</i> .

[†] From the Adopted Levels except as noted.

ε, β^+ radiations

See comment on $Q(\beta^{-})$ in ⁵⁰Cr Adopted Levels for $Q(\varepsilon)$ measurements. Others: 1992KoZV and 1992HaZU.

E(decay)	E(level)	$\mathrm{I}\beta^+$ ‡	$\mathrm{I}\varepsilon^{\ddagger}$	Log ft	$I(\varepsilon + \beta^+)^{\dagger \ddagger}$	Comments
(2636.48 7)	4998	0.0007 1	5.×10 ⁻⁵ 1	5.90 7	0.0007 1	av Eβ=699.88 92; εK=0.05959 22; εL=0.006210 23; εM+=0.001076 4
(3807.48 [#] 7)	3827?	< 0.0003	<4.×10 ⁻⁶	>7.3	< 0.0003	av Eβ=1246.08 95; εK=0.01191 3; εL=0.001239 3; εM+=0.0002148 5
(4006.48 7)	3628	0.056 3	0.00062 3	5.14 2	0.057 4	av $E\beta$ =1340.65 96; ε K=0.009699 20; ε L=0.0010094 2; ε M+=0.0001749 4
(7634.48 7)	0	99.839 <i>3</i>	0.1029 <i>10</i>	3.4846 2	99.9423 30	av E β =3104.00; ε K=0.0009174; ε L=9.536×10 ⁻⁵ ; ε M+=1.652×10 ⁻⁵ Log <i>ft</i> : 2009Ha12 give <i>ft</i> =3048.4 s <i>12</i> which implies log <i>ft</i> =3.48407 <i>17</i> , somewhat different from the value from log <i>ft</i> code. Others: 3.48350 <i>23</i> (1994Wi05 for T _{1/2} =283.522 ms 73 and Q(ε)= 7632.62 <i>23</i> ; earlier value: 3.4995 5 from 1993Wi23 and 1993Wi22 for T _{1/2} =282.81 ms <i>20</i> and Q(ε)=7632.25 <i>32</i>), 3.4873 7 (1990Ha13, 1984KoZH for T _{1/2} =283.07 ms <i>36</i> and Q(ε)=7632.16 <i>32</i> , corrections from 1975Ha45, 1973To04,1977To11 and 1984ToZS). Other:
						1965Fr08. Consult NSR database for additional references for this superallowed transition.

[†] From 2009Ha12 evaluation based on measurements in 1994Ha43 and 1993HaZT.

⁵⁰Mn ε decay (283.19 ms) 1994Ha43,2009Ha12 (continued)

ε, β^+ radiations (continued)

 $\gamma(^{50}\mathrm{Cr})$

[‡] Absolute intensity per 100 decays.

[#] Existence of this branch is questionable.

$E_{\gamma}^{\#}$	$I_{\gamma}^{\&}$	E_i (level)	\mathbf{J}_i^{π}	$E_f J_f^{\pi}$	Mult.@	Comments
(783)	1.978×10 ⁻⁶ 15	783	2+	0 0+	E2	E_{γ} : from the Adopted Gammas (evaluators). I_{γ} : from ΣI_{γ} to 783 state (evaluators).
2844	0.019^{\dagger} 2	3628	1^{+}	783 2+		
3044 ^{<i>a</i>}	<0.0003	3827?	0+	783 2+		E_{γ} , I_{γ} : from 1994Ha43. A 3045 γ was also assigned to 50m Mn β^+ decay; from comparison of pure 50m Mn and mixed 50 Mn and 50m Mn samples 1994Ha43 concluded that this is a doublet and up to 60% of the peak area in the mixed sample spectra may be attributed to a nonanalog decay branch in 50 Mn.
3628	0.038 2	3628	1^{+}	$0 \ 0^+$	M1	
(4215)	0.0007 [‡] 1	4998	$1^{(+)}$	783 2+		E_{γ} : Existence suggested by evaluators based on details in 1994Ha43.

[†] From the Adopted branching ratios and $I(\varepsilon + \beta +)$ to 3628 (evaluators).

[±] From I(ε + β +) to state assuming no other deexciting γ rays (evaluators). [#] From 1993HaZT, except as noted.

[@] From Adopted Gammas.

[&] Absolute intensity per 100 decays. ^a Placement of transition in the level scheme is uncertain.

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Decay Scheme $\begin{array}{l} I_{\gamma} < 2\% \times I_{\gamma}^{max} \\ I_{\gamma} < 10\% \times I_{\gamma}^{max} \\ I_{\gamma} > 10\% \times I_{\gamma}^{max} \\ \gamma \, \text{Decay (Uncertain)} \end{array}$ Intensities: $I_{(\gamma+ce)}$ per 100 parent decays $\frac{0}{Q_{\varepsilon}=7634.48} \frac{0.0}{7}$ 283.19 ms 10 Coincidence 0^+ Coincidence (Uncertain) $\%\varepsilon + \%\beta^+ = 100.0$ $^{50}_{25}Mn_{25}$ 1 *215 0.0080 1 \$ 304 | 70.0030 $I\beta^+$ <u>I</u>2 Log ft +328 M1 | +384 002 041 $1^{(+)}$ 4998 0.0007 0.00005 5.90 <u>3827</u> 3628 $<\! 0.0003 \quad <\! 4.\times 10^{-6} >\! 7.3$ 0 0.00062 5.14 0.056 + 283 & 2000000 + 283 + 1 2^{+} 783 0 0^+ 99.839 0.1029 3.4846 $^{50}_{24}{\rm Cr}_{26}$