

^{45}Fe ε 3p decay (2.45 ms) [2007Mi36](#),[2007Mi40](#),[2009Mi29](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen [#] and Balraj Singh		NDS 135, 1 (2016)	31-May-2016

Parent: ^{45}Fe : $E=0$; $J^\pi=(3/2^+)$; $T_{1/2}=2.45$ ms 23; $Q(\varepsilon 3p)=16670$ SY; $\% \varepsilon 3p$ decay=3.3 15

^{45}Fe - J^π : From Adopted Levels of ^{45}Fe in the ENSDF database (Oct 2007 update).

^{45}Fe - $T_{1/2}$: Weighted average of 4.7 ms +34-14 ([2002Gi09](#), earlier value of 6.0 ms +17-3 in [2001Gi02](#), GANIL); 3.2 ms +26-10 ([2002Pf02](#), GSI); 1.6 ms +5-3 ([2005Do20](#), GANIL); 2.6 ms 2 ([2007Mi40](#),[2007Mi36](#), [2009Mi29](#), NSCL-MSU); 3.6 ms +16-8 ([2012Au08](#),[2007Gi10](#), GANIL). Others: 2.5 ms 2 ([2008BI03](#), review paper, average of four values in literature); 2.56 ms 14 ([2012Au08](#), average of their value with two previous values in literature).

^{45}Fe - $Q(\varepsilon 3p)$: Deduced by the evaluators from masses taken from [2012Wa38](#), estimated $\Delta Q=400$.

^{45}Fe - $\% \varepsilon 3p$ decay: $\% 2p=70$ 4 ([2007Mi36](#),[2007Mi40](#),[2009Mi29](#)), $\% \varepsilon + \% \beta^+ = 30$ 4, $\% \beta^+ p = 19$ 3, $\% \beta^+ 2p = 7.8$ 20, $\% \beta^+ 3p = 3.3$ 15 ([2007Mi36](#), [2007Mi40](#),[2009Mi29](#)). The $\% \varepsilon + \% \beta^+$ branch=30 4 assumes that all such $\varepsilon + \beta^+$ decay events are followed by delayed proton decays. Others: $\% 2p=78$ +14-22 ([2012Au08](#)), 57 10 ([2005Do20](#)), 70-80 ([2002Gi09](#)), ≈ 80 ([2002Pf02](#)).

First observation of β -delayed three proton channel by [2007Mi36](#).

[2007Mi36](#), [2007Mi40](#), [2009Mi29](#) (also [2008Mi03](#)): ^{45}Fe was produced by the fragmentation of a 161 MeV/nucleon ^{58}Ni beam on a 800 mg/cm² natural nickel target at National Superconducting Cyclotron laboratory (NSCL) at MSU. Fragments were separated using the A1900 fragment separator and identified in-flight by time-of-flight (TOF) and energy-loss with a plastic scintillator and a thin silicon detector. Silicon detector was used to measured time-of-flight and δE . Identified ions stopped in a gaseous detector-the Optical Time Projection Chamber (OTPC) for measuring emitted protons. Measured decay branches, $T_{1/2}$. Out of a total of 125 observed decays of ^{45}Fe , 87 events were assigned to direct 2p decay, 38 to $\varepsilon + \beta^+$ decay followed by proton emission. Out of 38 $\varepsilon + \beta^+$ decay events, 24 were of $\beta^+ P$ type, ten of $\beta^+ 2p$ and four of $\beta^+ 3P$ type.

[2012Au08](#): measured half-life of ^{45}Fe decay and 2p-decay branching ratio at GANIL.

 ^{42}Ti Levels

<u>E(level)</u>	<u>J^π</u>
0	0^+