^{65}Mn β^-n decay (91.8 ms) 2013Ol06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178, 41 (2021).	12-Nov-2021

Parent: ^{65}Mn: E=0; $T_{1/2}$=91.8 ms *9*; Q(β^-n)=5931 *6*; %β^-n decay=7.9 *12*

^{65}Mn-$T_{1/2}$: From weighted average of 91.9 ms *9* (2013Ol06, β(363.7γ)-coin, authors also report 92.0 ms *13* from analysis of five other γ rays from the decay of ^{65}Mn); 84 ms *8* (2011Da08, also 2002MaZN, $\beta\gamma$-coin); 92 ms *1* (2003So21, also 2005GaZR, ion-β, earlier value was 100 ms *8* in 1999So20 and 1999Le67); 88 ms *4* (1999Ha05, also 2000HaZL, βn-coin). Others: 85 ms *+10−9* (2005NiZZ, $\beta\gamma$-coin, preliminary result); 110 ms *20* (1998Am04, ion-β). Weighted average is the same if all the available values are used.

^{65}Mn-Q(β^-n): From 2021Wa16.

^{65}Mn-%β^-n decay: %β^-n=7.9 *12* for the decay of ^{65}Mn (2013Ol06, from γ-intensities in the daughter nucleus, normalized to the observed total observed γ-ray intensity from the decay of ^{65}Mn, and the absolute intensity of the 1345.1-keV γ ray in ^{64}Ni from ^{64}Fe → ^{64}Co → ^{64}Ni decay). Other: %β^-n=21.0 *5* from 2000HaZL (preliminary result and interpreted as feeding the g.s. of ^{64}Fe) is in severe disagreement with result from 2013Ol06 which is based on more comprehensive and complete analysis of the decay of ^{65}Mn.

2013Ol06: measured half-life of ^{65}Mn, β-delayed neutron emission probability from the intensities of the γ rays in the daughter nucleus. Experiments carried out at ISOLDE-CERN.

2011Da08 (also 2002MaZN); 2005NiZZ; 2003So21 (also 2005GaZR, 1999So20, 1999Le67); 1999Ha05 (also 2000HaZL): measured half-life of ^{65}Mn decay.

2000HaZL: measured delayed neutron spectrum, deduced %β^-n.

^{64}Fe Levels

E(level)†	J$^\pi$‡	$T_{1/2}$‡
0.0	0^+	2.0 s *3*
746.4 *1*	2^+	6.8 ps *7*
1763.8 *3*	4^+	<1.25 ps
1852.2 *5*	$(1,2^+)$	
2117.1 *5*	$(1,2^+)$	

† From Eγ data.
‡ From Adopted Levels.

γ(^{64}Fe)

Iγ normalization: From 2013Ol06.

2013Ol06 state "There are a few high-energy transitions for which no coincidences were observed. They are assigned to ^{65}Fe, although there is a minor possibility that they belong ^{64}Fe. Without a detailed ^{64}Fe level scheme, this possibility cannot be completely excluded". Above 1 MeV, in Table I of 2013Ol06, there is one unplaced γ and 13 γ rays which are shown as single γ rays from levels feeding the ground state of ^{65}Mn, with a total relative intensity of 2.9 *4* units. It is possible that some of this intensity is connected with the β^-n decay of ^{65}Mn.

E$_\gamma$†	I$_\gamma$†#	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.‡	Comments
746.4 *1*	4.4 *2*	746.4	2^+	0.0	0^+	E2	Absolute intensity (per 100 decays of ^{65}Mn)=2.4 *1* (2013Ol06).
1017.4 *3*	0.4 *1*	1763.8	4^+	746.4	2^+	E2	
1105.8 *5*	0.5 *1*	1852.2	$(1,2^+)$	746.4	2^+		
1370.7 *5*	0.2 *1*	2117.1	$(1,2^+)$	746.4	2^+		

† From 2013Ol06. Intensities are relative to 100 for 363.7-keV γ ray in ^{65}Fe from ^{65}Mn β^- decay.

Continued on next page (footnotes at end of table)

^{65}Mn β^-n decay (91.8 ms) 2013Ol06 (continued)

$\gamma(^{64}Fe)$ (continued)

‡ From the Adopted Gammas.
# For absolute intensity per 100 decays, multiply by 0.539 *19*.

Delayed Neutrons (^{64}Fe)

E(^{64}Fe)	I(n)†	Comments
0.0	5.4 *12*	I(n): from 2013Ol06, from 7.9 *12*-(2.5 *2*, summed neutron feedings to excited states).
746.4	1.8 *2*	
1763.8	0.22 *5*	
1852.2	0.27 *5*	
2117.1	0.11 *5*	

† Values are per 100 decays of ^{65}Mn decay.

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Decay Scheme

Intensities: I_γ per 100 parent decays