## Adopted Levels

| History | | | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | Balraj Singh | ENSDF | 20-Feb-2010 |

Q($\beta^-$)=−1.35×10$^4$ *syst*; S(n)=1.59×10$^4$ *syst*; S(p)=7.×10$^2$ *syst*; Q($\alpha$)=−7.8×10$^3$ *syst* 2012Wa38

Note: Current evaluation has used the following Q record −13130 syst 15330 syst 690 syst −6630 syst 2009AuZZ,2003Au03.

Estimated uncertainties: 370 for Q($\beta^-$), 320 for S(n), 520 for S(p), 230 for Q($\alpha$) (2009AuZZ,2003Au03).

Q($\varepsilon$p)=12220 *110* (syst,2009AuZZ,2003Au03).

1992Bo37, 1987Po04: $^{46}$Mn observed from interaction of a $^{58}$Ni beam at E($^{58}$Ni)=55 MeV/u and 69 MeV/u with natural nickel target using magnetic separation, Wien filter and identification through time-of-flight and ΔE-E measurements. $\beta^+$ decay scheme observed.

2001Gi01 (also 2001Gi02): Ni($^{58}$Ni,X) E=74.5 MeV/nucleon. Fragments selected by the $\alpha$-LISE3 fragment separator with a Be degrader and Wien filter at GANIL. Ions implanted in a Si-detector telescope which measured ΔE, E, and position. With tof measurements, started both by the cyclotrons′ high-frequency and a micro-channel plate detector before the Wien filter, implanted ions could be identified. The telescope was surrounded by Ge detectors to measure $\gamma$′s in the radioactive decay.

1994Bl10: $^9$Be($^{58}$Ni,X) E=650 MeV/nucleon, Fragment separator FRS at GSI facility, measured cross section for the production of $^{46}$Mn.

2007Do17: $^{46}$Mn produced in fragmentation of $^{58}$Ni$^{26+}$ beam at 74.5 MeV/nucleon with natural Ni target at SISSE/LISE3 facility in GANIL. Fragment separator=$\alpha$−LISE3. Fragment identification by energy loss, residual energy and time-of-flight measurements using two micro-channel plate (MCP) detectors and Si detectors. Double-sided silicon-strip detectors (DSSSD) and a thick Si(Li) detector were used to detect implanted events, charged particles and $\beta$ particles. The $\gamma$ rays were detected by four Ge detectors. Coincidences measured between charged particles and $\gamma$ rays. $T_{1/2}$ measured by time correlation of implantation events due to $^{46}$Mn and subsequent emission of protons and/or $\gamma$ rays. Total proton branching ratio is from time spectrum of events with energy >900 keV in the charged-particle spectrum. Possible small contributions from delayed-$\alpha$ and delayed-2p decays are ignored. 2007Do17 and 2001Go01 are from the same group. Some of the results in 2007Do17 are an improved analysis of experiments reported in 2001Gi01.

Mass excess of g.s.=−12490 *30* (2007Do17), −12375 *120* (1992Bo37) from IMME analysis.

Structure calculations using shell model: 1999Ca12: levels, B(E2), G-T sum rules, etc.

### $^{46}$Mn Levels

Cross Reference (XREF) Flags

A $^{46}$Fe $\varepsilon$ decay (13.0 ms)

| E(level) | J$^\pi$ | $T_{1/2}$ | XREF | Comments |
|---|---|---|---|---|
| 0.0 | (4$^+$) | 36.2 ms *4* | A | %$\varepsilon$+%$\beta^+$=100; %$\varepsilon$p=57.0 *8* (2007Do17)<br>T=2<br>XREF: A(?).<br>%$\varepsilon$p: from 2007Do17. Others: 58 *9* (2001Gi01, earlier value from the same group as 2007Do17); 22 *2* (1992Bo37).<br>J$^\pi$: T=2 quadruplet in $^{46}$Sc (g.s.,4$^+$), $^{46}$Ti (9168,4$^+$,tentatively identified as IAS of $^{46}$Sc g.s.), $^{46}$Cr (9152 state) and $^{46}$Mn (g.s.). Superallowed type $\beta^+$ decay (log *ft*≈3.4) to the 9152 level of $^{46}$Cr is consistent with this interpretation.<br>$T_{1/2}$: from 2007Do17. Others: 34.0 ms $^{45-35}$ (2001Gi01, earlier value from the same group as 2007Do17); 41 ms *+7−6* (1992Bo37). |
| 5017 *71* | 0$^+$ | | A | This state is expected to decay by proton emission. The 2p decay mode is energetically possible but predicted rate is small. From measurements in 2007Do17, only 7.9% *32* proton branch is known, with no evidence for 2p decay mode.<br>E(level): IAS of $^{46}$Fe g.s. For energy, see detailed comment in $^{46}$Fe $\varepsilon$ decay. |