## $^{47}$Fe $\varepsilon$p decay (21.9 ms)    2007Do17

History

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

Parent: $^{47}$Fe: E=0; J$^\pi$=(7/2$^-$); T$_{1/2}$=21.9 ms $2$; Q($\varepsilon$p)=15560 $SY$; %$\varepsilon$p decay=88.4 $9$

$^{47}$Fe-Q($\varepsilon$p): 15560 $260$ (syst,2009AuZZ,2003Au03).

$^{47}$Fe-T$_{1/2}$: Measured by 2007Do17. Other: 21.8 ms $7$ (2001Gi01).

$^{47}$Fe-%$\varepsilon$p decay: %$\varepsilon$p=88.4 $9$ (2007Do17).

2007Do17: $^{47}$Fe 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 $^{47}$Fe and subsequent emission of protons and $\gamma$ 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.

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 $\Delta$E, 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.

### $^{46}$Cr Levels

| E(level) | J$^\pi$ |
|----------|---------|
| 0 | 0$^+$ |
| 892.1 $1$ | 2$^+$ |
| 1987.0 $3$ | (4$^+$) |
| 3196.6 $11$ | (3$^-$) |

### $\gamma$($^{46}$Cr)

I$\gamma$ normalization: Absolute intensities (per 100 decays of $^{47}$Fe) are given by 2007Do17.

| E$_\gamma$ | I$_\gamma$[†] | E$_i$(level) | J$^\pi_i$ | E$_f$ | J$^\pi_f$ |
|-----------|---------------|--------------|-----------|-------|-----------|
| 892.1 $1$ | 76 $5$ | 892.1 | 2$^+$ | 0 | 0$^+$ |
| 1094.9 $3$ | 22 $3$ | 1987.0 | (4$^+$) | 892.1 | 2$^+$ |
| 2304.5 $11$ | 3.5 $10$ | 3196.6 | (3$^-$) | 892.1 | 2$^+$ |

[†] Absolute intensity per 100 decays.

### Delayed Protons ($^{46}$Cr)

| E(p)[†] | E($^{46}$Cr) | I(p)[‡@] | E($^{47}$Mn)[#] | Comments |
|---------|--------------|----------|-----------------|----------|
| 1548 $19$ | | 1.9 $7$ | | |
| 1718 $20$ | | 4.0 $12$ | | |
| 1864 $15$ | | 5.3 $7$ | | In coin with 892.1$\gamma$ and 1094.9$\gamma$. |
| 2462 $29$ | | 1.9 $7$ | | |
| 3.0×10$^3$ | | | | E(p): wide bump, in coin with 892.1$\gamma$ and 1094.9$\gamma$. |
| 3973[&] $20$ | 3196.6 | 4.4 $12$ | 7029 | E(p): other: 3890 $25$ (2001Gi01). In coin with 892.1$\gamma$ and 2304$\gamma$. |

Continued on next page (footnotes at end of table)

## $^{47}$Fe $\varepsilon$p decay (21.9 ms)　　　2007Do17 (continued)

### Delayed Protons (continued)

| E(p)[†] | E($^{46}$Cr) | I(p)[‡][@] | E($^{47}$Mn)[#] | Comments |
|---|---|---|---|---|
| 4959 *29* | 1987.0 | 2.0 *4* | 7029 | E(p): average (by 2007Do17) of 5000 *15* (2007Do17) and 4880 *20* (2001Gi01). |
| 6063 *35* | 892.1 | 3.7 *7* | 7029 | E(p): average (by 2007Do17) of 6104 *24* (2007Do17) and 5975 *25* (2001Gi01). In coin with 892.1$\gamma$. |

[†] The proton energies are in the center-of-mass system, values are from 2007Do17 unless otherwise stated.

[‡] From 2007Do17, absolute proton branchings.

[#] 7029 *161*, (7/2$^-$) in $^{47}$Mn is the IAS of $^{47}$Fe g.s. parent. Other: 6868 *164* (2001Gi01).

[@] Absolute intensity per 100 decays.

[&] Placement of transition in the level scheme is uncertain.

$^{47}$Fe $\varepsilon$p decay (21.9 ms)　　　2007Do17 (continued)

## ${}^{47}$Fe $\varepsilon$p decay (21.9 ms)     2007Do17

### Decay Scheme

$\gamma$ Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
I(p) Intensities: I(p) per 100 parent decays

| E(p) | I(p) | E(${}^{47}_{25}$Mn) | E(${}^{46}_{24}$Cr) |
|------|------|------|------|
| 6063 | 3.7 | 7029 | 892.1 |
| 4959 | 2.0 | 7029 | 1987.0 |
| 3973 | 4.4 | 7029 | 3196.6 |

(7/2$^-$)          0    21.9 ms *2*

%$\varepsilon$p=88.4          Q$_{\varepsilon p}$=15560 *SY*

${}^{47}_{26}\text{Fe}_{21}$

7029

${}^{47}_{25}\text{Mn}_{22}$

(3$^-$)          3196.6

(4$^+$)          1987.0

2$^+$          892.1

0$^+$          0

2304.5 3.5

1094.9 22

892.1 76

${}^{46}_{24}\text{Cr}_{22}$