## $^{51}$Ni εp decay (23.8 ms) 2007Do17

History

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

Parent: $^{51}$Ni: E=0; $J^\pi$=(7/2$^-$); $T_{1/2}$=23.8 ms *2*; Q(εp)=15260 *90*; %εp decay=87.2 *8*

$^{51}$Ni-$J^\pi$: From systematics.

$^{51}$Ni-Q(εp): Deduced from IMME analysis of mass excess=−11927 *65* for $^{51}$Ni (2007Do17). Other: 15290 *500* (syst, 2017Wa10).

$^{51}$Ni-$T_{1/2}$: Measured by 2007Do17, adopted in Adopted Levels of $^{51}$Ni.

$^{51}$Ni-%εp decay: %εp=87.2 *8* (2007Do17).

2007Do17: Fragmentation reaction used to produce $^{51}$Ni isotope at SISSE/LISE3 facility in GANIL. Primary beam: $^{58}Ni^{26+}$ at 74.5 MeV/nucleon; target=natural Ni. Fragment separator=α−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 β particles. The γ rays were detected by four Ge detectors. Coincidences measured between charged particles and γ rays $T_{1/2}$ measured by time correlation of implantation events due to $^{51}$Ni and subsequent emission of protons and γ 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-α and delayed-2p decays are ignored.

### $^{50}$Fe Levels

| E(level) | $J^\pi$ | Comments |
|---|---|---|
| 0.0 | $0^+$ | |
| 765.3 *6* | $2^+$ | |
| 1851.9 *7* | $(4^+)$ | |
| 3397.6 *10* | $(4^+)$ | E(level): probable mirror state of 3324.6, $4^+$ in $^{50}$Cr. |

### γ($^{50}$Fe)

| $E_\gamma$ | $I_\gamma$[†] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ |
|---|---|---|---|---|---|
| 765.3 *6* | 73 *4* | 765.3 | $2^+$ | 0.0 | $0^+$ |
| 1086.6 *3* | 29 *3* | 1851.9 | $(4^+)$ | 765.3 | $2^+$ |
| 1545.7 *7* | 4.2 *12* | 3397.6 | $(4^+)$ | 1851.9 | $(4^+)$ |
| [x]1743.4 *10* | 4.4 *15* | | | | |

[†] Absolute intensity per 100 decays.

[x] γ ray not placed in level scheme.

### Delayed Protons ($^{50}$Fe)

| E(p)[†] | E($^{50}$Fe) | I(p)[‡] |
|---|---|---|
| 1084 *41* | | 1.3 *8* |
| 1356 *23* | | 1.5 *5* |
| 1859 *20* | | 3.0 *9* |
| 2234 *18* | | 1.8 *5* |
| 2515 *28* | | 4.8 *22* |
| 2915 *17* | | 4.0 *9* |
| 3121 *31* | | 2.1 *10* |
| 3421 *23* | | 0.5 *4* |
| 3709 *29* | | 1.5 *5* |
| 3929 *24* | | 1.1 *6* |
| 4415 *27* | | 0.5 *3* |
| 5664 *30* | | 0.9 *4* |

Continued on next page (footnotes at end of table)

## $^{51}$Ni εp decay (23.8 ms) 2007Do17 (continued)

Delayed Protons (continued)

| E(p)† | E($^{50}$Fe) | I(p)‡ | E($^{51}$Co) | Comments |
|---|---|---|---|---|
| 4662 *16* | 1851.9 | 8.7 *8* | 6601 | E($^{51}$Co): IAS in $^{51}$Co with $J^{\pi}=7/2^{-}$. Value of 6001 in figure 47 of 2007Do17 seems a misprint. |

† The proton energies are in the center-of-mass system.
‡ Absolute intensity per 100 decays.

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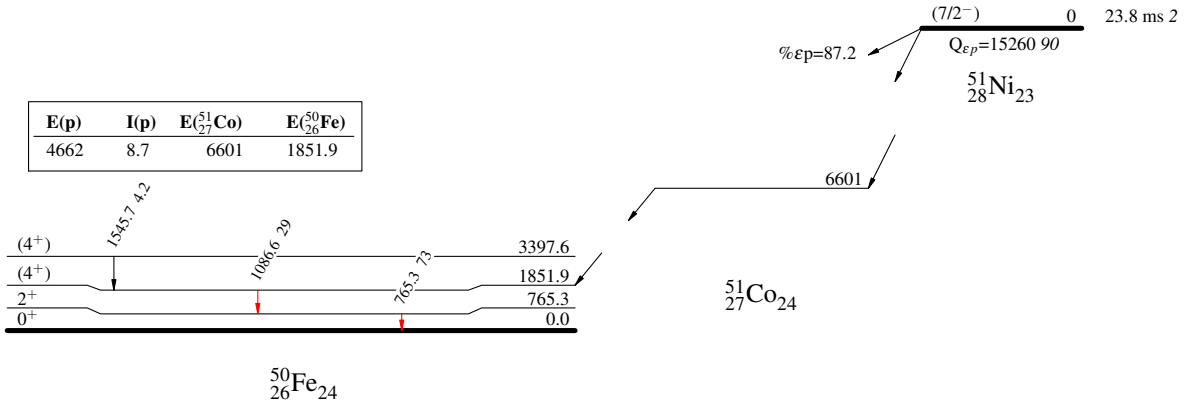
### Decay Scheme

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




| E(p) | I(p) | E($^{51}_{27}$Co) | E($^{50}_{26}$Fe) |
|---|---|---|---|
| 4662 | 8.7 | 6601 | 1851.9 |