## $^{44}$Cr εp decay (42.8 ms) 2007Do17,2014Po05

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh and Jun Chen[#] | NDS 126, 1 (2015) | 31-Mar-2015 |

Parent: $^{44}$Cr: E=0; $J^{\pi}=0^{+}$; $T_{1/2}$=42.8 ms *6*; Q(εp)=8400 *SY*; %εp decay=12 *2*

$^{44}$Cr-$T_{1/2}$: From $^{44}$Cr Adopted Levels in ENSDF database, taken from 2007Do17. Others: 25 ms *+6−4* from 2014Po05 (time correlation of implantation events due to $^{44}$Cr and subsequent emission of protons, and using the maximum likelihood method); 53 ms *+4−3* (1992Bo37). All the three values are in disagreement. Unweighted average of three values is 40.3 ms *82*, much nearer to the 2007Do17 value.

$^{44}$Cr-Q(εp): 8400 *300* (syst,2012Wa38).

$^{44}$Cr-%εp decay: %εp=10 *1* (2014Po05), 14.0 *9* (2007Do17). 2014Po05 discuss accuracy of results in the two measurements.

2007Do17: Fragmentation reaction used to produce $^{44}$Cr isotope at SISSE/LISE3 facility in GANIL. Primary beam: $^{58}Ni^{26+}$ at 74.5 MeV/nucleon; target=natural Ni. 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 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 $^{44}$Cr 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.

2014Po05: $^{44}$Cr isotope produced in fragmentation of Ni target with a $^{58}$Ni beam at 160 MeV/nucleon from the NSCL, MSU facility. Fragments separated with the A1900 fragment separator and identified using time-of-flight and energy-loss techniques. The optical time projection chamber (OTPC) was used to detect fragments and the decay of heavy particles such as protons or α particles. Measured half-life of $^{44}$Cr g.s. from time correlation of implantation events and subsequent emission of protons. Total proton branching ratio was measured based on incoming ions and decay events.

### $^{43}$Ti Levels

| E(level) |
|---|
| 0 |

### Delayed Protons ($^{43}$Ti)

| E(p)[†] | E($^{43}$Ti) | I(p) | Comments |
|---|---|---|---|
| 742 *26* | | 0.6 *2* | E(p): reported by 2014Po05 only; uncertainty of 24 keV from minimization procedure and 10 keV from drift velocity added in quadrature. |
| 1384 *12* | | 1.1 *3* | E(p)=1340 *62*, I(p)=1.4% *3* (2014Po05). |
| 1741 *15* | | 0.6 *3* | E(p)=1680 *44*, I(p)=0.5% *2* (2014Po05). |
| 908 *11* | 0 | 1.7 *3* | E(p)=896 *53*, I(p)=2.7% *5* (2014Po05). |

[†] The proton energies are in the center-of-mass system.