Adopted Levels, Gammas

Type	History Author	Citation	Literature Cutoff Date
Full Evaluation	B. Singh and A. Chakraborty	ENSDF	11-Jun-2013

Q(β^-)=−15280 *SY*; S(n)=14230 *SY*; S(p)=2930 *SY*; Q(α)=−7310 *30* 2012Wa38
Estimated uncertainties (2012Wa38): 800 for Q(β^-), 700 for S(n), 200 for S(p).
S(2n)=32840 *800* (syst), S(2p)=4006 *27*, Q(εp)=11142 *26* (2012Wa38). Mass excess=−29631 *25* (2012Au07).
1976Vi02 (also 1979ViZY thesis): ^{53}Ni produced and identified in ^{40}Ca(^{16}O,3n),E=60,65 MeV at LBNL cyclotron facility. Measured half-life from decay curve of 1.94 MeV proton group.
1993Xu04: ^{53}Ni produced in ^{28}Si(^{28}Si,X),E=104.0-127.2 MeV; measured delayed-proton spectrum; deduced half-life. Additional information 1.
1994Bl10: production of ^{53}Ni in ^{9}Be(^{58}Ni,X),E=650 MeV/nucleon, measured cross section using FRS at GSI facility.
2007Do17: fragmentation reaction used to produce ^{53}Ni 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 ^{53}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.
2012Zh34 (also 2013Ya03): precise mass measurement at HIRFL-CSR facility in Lanzhou using isochronous mass spectrometry technique, mass excess=−29631 *25*.
2013Su07: ^{58}Ni primary beam at E=68.6 MeV/nucleon provided by the Heavy Ion Research Facility in Lanzhou (HIRFL). Target=147 μg/cm^2 Ni at the Radioactive Ion Beam Line in Lanzhou (RIBLL). Measured β-delayed protons, (proton)γ-coin, Eγ, Iγ, time-of-flight, energy loss, $T_{1/2}$ using two plastic scintillator films, a thick silicon detector, a double-sided silicon strip detector (DSSSD) and five segmented clover detectors. Performed nucleosynthesis calculations of rapid proton-capture process in an x-ray burst.

^{53}Ni Levels

Cross Reference (XREF) Flags

A ^{9}Be(^{56}Ni,Xγ)

E(level)	J$^\pi$ †	$T_{1/2}$	XREF	Comments
0.0	(7/2$^-$)	55.2 ms *7*	A	%ε+%β^+=100; %εp=23.4 *10* (2007Do17) T=3/2 J$^\pi$: IAS of 4390, (7/2$^-$) in ^{53}Co; mirror analog of g.s. 7/2$^-$ in ^{53}Mn. $T_{1/2}$: from proton decay curve over 20 half-lives (2007Do17). Others: 56 ms *8* (2013Su07,from proton decay curve over about 9 half-lives); <85 ms (1993Xu04), 45 MS 15 (1976Vi02,1979ViZY, from proton decay curve for about four half-lives); %εp: from 2007Do17. Other: ≈45% (1976Vi02). 2013Su07 report proton peaks at 1929 and 2399 keV. 2007Do17 report six proton groups at 1077, 1251, 1639, 1939, 2111, and 2399 keV.
319.7 *50*	(5/2$^-$)		A	J$^\pi$: mirror analog of 378, 5/2$^-$ in ^{53}Mn.
1453.4 *58*	(11/2$^-$)		A	J$^\pi$: mirror analog of 1441, 11/2$^-$ in ^{53}Mn.

† From mirror states in ^{53}Mn (2009Br06).

Adopted Levels, Gammas (continued)

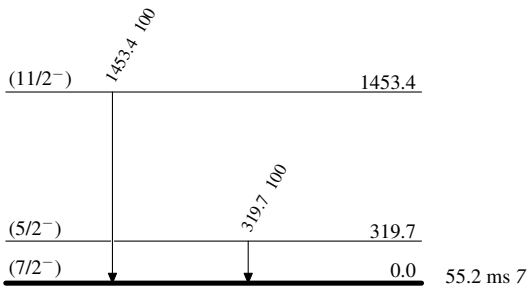
$\gamma(^{53}Ni)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
319.7	(5/2$^-$)	319.7 *50*	100	0.0	(7/2$^-$)
1453.4	(11/2$^-$)	1453.4 *58*	100	0.0	(7/2$^-$)

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{53}_{28}Ni_{25}$