^{54}Ni ε decay 2012MoZW

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde	NDS 121, 1 (2014)	20-Jun-2014

Parent: ^{54}Ni: E=0.0; $J^{\pi}=0^+$; $T_{1/2}$=114.2 ms *3*; Q(ε)=8.79×10^3 *5*; %ε+%β^+ decay=100.0

^{54}Ni-$T_{1/2}$: From 2012MoZW.

1999Re06: source from ^{54}Fe(^{3}He,3n) E=45 MeV, enriched target (96.66%), measured Eγ, $\beta\gamma$-coin.

2008Fu04: source from ^{54}Fe(^{3}He,3n) E=45 MeV, Leuven radioisotope separator facility (LISOL), the mass separated ions were implanted on a tape system surrounded by three plastic β detectors and two miniball detectors composed of three 6-fold segmented Ge crystals in a common cryostat, measured β^-decay half-life.

2008BoZG: source from ^{54}Fe(^{3}He,3n) E=140 MeV/nucleon, GSI fragment separator, a Ge detector array of 15 euroball cluster detectors and variety of ancillary particle detectors, measured Eγ.

2012MoZW: source from Be(^{58}Ni,X) E=680 MeV/nucleon. Reaction fragments were separate in-flight in the frs. Separated ions were implanted in one of six dsssd. The b-decay signals were detected in the same dsssd. Surrounding the implantation setup was the rising gamma-ray array of 15 euroball cluster detectors, measured Eγ, Iγ, and β^-decay half-life.

All data are from 2012MoZW, except as noted.

^{54}Co Levels

E(level)	J^{π}	$T_{1/2}$
0.0	0^+	193.28 ms *7*
936.7 *1*	1^+	
2424.6 *3*	1^+	
3376.1 *2*	1^+	
3889.6 *2*	1^+	
4293.4 *10*	1^+	
4323.0 *7*	1^+	
4543.8 *4*	1^+	
4822.8 *7*	1^+	
5202.4 *5*	1^+	

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(3.59×10^3 *5*)	5202.4	0.020 *10*	0.0005 *3*	4.88 *22*	0.020 *10*	av Eβ=1144 *24*; εK=0.0233 *14*; εL=0.00250 *15*; εM+=0.00043 *3*
(3.97×10^3 *5*)	4822.8	0.120 *10*	0.00213 *21*	4.37 *5*	0.120 *10*	av Eβ=1324 *24*; εK=0.0155 *8*; εL=0.00166 *9*; εM+=0.000289 *15*
(4.25×10^3 *5*)	4543.8	0.15 *5*	0.0020 *7*	4.46 *15*	0.15 *5*	av Eβ=1457 *24*; εK=0.0119 *6*; εL=0.00127 *6*; εM+=0.000221 *11*
(4.47×10^3 *5*)	4323.0	0.11 *10*	0.0012 *12*	4.7 *4*	0.11 *10*	av Eβ=1562 *24*; εK=0.0098 *5*; εL=0.00105 *5*; εM+=0.000182 *8*
(4.50×10^3 *5*)	4293.4	0.21 *3*	0.0023 *4*	4.46 *7*	0.21 *3*	av Eβ=1577 *24*; εK=0.0095 *5*; εL=0.00102 *5*; εM+=0.000177 *8*
(4.90×10^3 *5*)	3889.6	0.37 *4*	0.0029 *4*	4.43 *6*	0.37 *4*	av Eβ=1771 *25*; εK=0.0069 *3*; εL=0.00074 *3*; εM+=0.000128 *5*
(5.41×10^3 *5*)	3376.1	0.37 *3*	0.00199 *18*	4.67 *5*	0.37 *3*	av Eβ=2019 *25*; εK=0.00476 *17*; εL=0.000510 *18*; εM+=8.9×10^{-5} *3*
(6.37×10^3 *5*)	2424.6	0.16 *3*	0.00048 *10*	5.43 *9*	0.16 *3*	av Eβ=2482 *25*; εK=0.00266 *8*; εL=0.000285 *8*; εM+=4.96×10^{-5} *14*
(7.85×10^3 *5*)	936.7	19.8 *12*	0.0288 *19*	3.84 *3*	19.8 *12*	av Eβ=3211 *25*; εK=0.00129 *3*; εL=0.000138 *3*; εM+=2.40×10^{-5} *6*
(8.79×10^3 *5*)	0.0	79.1 *12*	0.0785 *21*	3.501 *15*	79.2 *12*	av Eβ=3673 *25*; εK=0.000881 *17*; εL=9.43×10^{-5} *19*; εM+=1.64×10^{-5} *4*

† Absolute intensity per 100 decays.

^{54}Ni ε decay 2012MoZW (continued)

$\gamma(^{54}Co)$

Iγ normalization, I(γ+ce) normalization: From I($\varepsilon+\beta^+$)=79.1 *12* to g.s. of ^{54}Co (2012MoZW).

E_γ	I_γ †	E_i(level)	J^π_i	E_f	J^π_f
936.7 *1*	100 *4*	936.7	1^+	0.0	0^+
2424.6 *3*	0.80 *13*	2424.6	1^+	0.0	0^+
3376.1 *2*	1.89 *16*	3376.1	1^+	0.0	0^+
3889.6 *2*	1.06 *12*	3889.6	1^+	0.0	0^+
4293.4 *10*	0.6 *5*	4293.4	1^+	0.0	0^+
4323.0 *7*	0.74 *23*	4323.0	1^+	0.0	0^+
4543.8 *4*	0.6 *1*	4543.8	1^+	0.0	0^+
4822.8 *7*	0.23 *5*	4822.8	1^+	0.0	0^+
5202.4 *5*	0.124 *4*	5202.4	1^+	0.0	0^+

† For absolute intensity per 100 decays, multiply by 0.197 *13*.

^{54}Ni ε decay 2012MoZW

Decay Scheme