^{53}Ca β^- decay (461 ms)   2010Cr02

| | History | | |
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	10-Feb-2014

Parent: ^{53}Ca: E=0; J$^\pi$=(1/2$^-$); T$_{1/2}$=461 ms *90*; Q(β^-)=8.72×10^3 *27*; %β^- decay=100.0

^{53}Ca-J$^\pi$,T$_{1/2}$: From ^{53}Ca Adopted Levels.

^{53}Ca-Q(β^-): 8722 *270* from mass excess of ^{53}Ca=−29388 *43* (measured by 2013Wi06) and mass excess of ^{53}Sc=−38110 *270* (2012Wa38). 2012Wa38 give 9650 *480* from systematics.

^{53}Ca-%β^- decay: %β^-=100, %β^-n=40 *10* (1983La23).

2008Ma01: ^{53}Ca produced in fragmentation of E=140 MeV/nucleon ^{76}Ge beam provided by the NSCL-MSU facility. Isotopes separated with A1900 fragment separator. Time-of-flight technique. Measured β particles using Beta Counting System of three Si PIN detectors, a double-sided silicon strip detector and six single sided silicon strip detectors. Detected γ rays using 16 Ge detectors of the Segmented Germanium array. Measured half-life of ^{53}Ca by fitting the decay curves to a function which included decay of the parent, growth and decay of daughter and a constant background. No gamma rays were seen in correlation with β rays.

2010Cr02: ^{53}Ca produced in fragmentation of E=130 MeV/nucleon ^{76}Ge beam provided by the NSCL cyclotrons K500 and K1200 at NSCL. Isotopes separated with A1900 fragment separator. Time-of-flight technique. Measured β particles using NSCL Beta Counting System of three Si PIN detectors, a double-sided silicon strip detector and six single sided silicon strip detectors. Detected prompt and delayed γ rays in coin with fragments using 16 Ge detectors of the Segmented Germanium array. Measured half-life of ^{53}Ca by fitting the decay curve of (^{53}Ca)β(2109γ) correlated events. Also 2009Cr03 from the same group.

^{53}Sc Levels

E(level)	J$^{\pi\dagger}$	T$_{1/2}$†
0	(7/2$^-$)	2.6 s *4*
2109.0 *3*	(3/2$^-$)	
x		

† From Adopted Levels.

β^- radiations

E(decay)	E(level)	I$\beta^{-\dagger}$	Log ft	Comments
	x	44 *12*		Iβ^-: 40% *10* was measured as β^-n branch (1983La23).
(6.6×10^3 *3*)	2109.0	56 *12*	4.4	av Eβ=3.06×10^3 *14*

† Absolute intensity per 100 decays.

γ(^{53}Sc)

Iγ normalization: Absolute γ intensity is given in 2010Cr02.

E$_\gamma$	I$_\gamma$†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
2109.0 *3*	56 *12*	2109.0	(3/2$^-$)	0	(7/2$^-$)	E$_\gamma$,I$_\gamma$: from 2010Cr02, intensity is absolute value.

† Absolute intensity per 100 decays.

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<u>Decay Scheme</u>

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

(1/2$^-$)	0	461 ms *90*

$Q_{\beta-}$=8.72×10^3 *27*   %β^-=100.0

${}^{53}_{20}\text{Ca}_{33}$

Iβ^-	Log ft
44	
56	4.4

2109.0 *56*

(3/2$^-$)   x   2109.0

(7/2$^-$)   0   2.6 s *4*

${}^{53}_{21}\text{Sc}_{32}$