

$^{54}\text{Sc} \beta^-$  decay 2010Cr02

Type	Author	History	Citation	Literature Cutoff Date
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Parent:  $^{54}\text{Sc}$ :  $E=0$ ;  $J^\pi=(3)^+$ ;  $T_{1/2}=526$  ms 15;  $Q(\beta^-)=1.200\times 10^4$  38;  $\% \beta^-$  decay=100.0

$^{54}\text{Sc}-T_{1/2}$ : [Additional information 1](#).

$^{54}\text{Sc}-\% \beta^-$  decay: Delayed neutron decay branch is estimated as 16% 9 (2010Cr02).

2010Cr02:  $^{54}\text{Sc}$  isotope produced in  $\text{Be}(^{76}\text{Ge}^{30+}, X)$  fragmentation reaction at  $E=130$  MeV/nucleon, A1900 fragment separator.

Time-of-flight technique. Fully stripped secondary fragments were sent to NSCL Beta Counting System (BCS). System of three Si PIN detectors, a double-sided silicon strip detector and six single sided silicon strip detectors. Detected  $\gamma$  rays using 16 Ge detectors of the Segmented Germanium array. Measured half-life of  $^{54}\text{Sc}$  by fitting the decay curves to a single exponential function with a constant background.

2004Li75:  $^{54}\text{Sc}$  isotope produced in  $^9\text{Be}(^{86}\text{Kr}^{34+}, X)$  fragmentation reaction at  $E=140$  MeV/nucleon, A1900 fragment separator.

Measured  $E_\gamma$ ,  $I_\gamma$ ,  $\gamma\gamma$ ,  $\beta\gamma$ ,  $\beta\gamma(t)$ , lifetime using a double-sided Si microstrip detector (DSSD) and the MSU segmented Germanium Array (SeGA). Identity of particle from energy loss and time of flight from a PIN detector, the NSCL  $\beta$  calorimeter, and scintillator. The SeGA array was arranged around the  $\beta$  counting system and comprised six Ge detectors. See also [2002Ja16](#).

$^{54}\text{Sc}$  source from  $\text{Be}(^{65}\text{Cu}, X\gamma)$   $E=64.5$  MeV/nucleon, measured  $E_\gamma, I_\gamma \beta\gamma$ -coin, see [1998So03](#).

All data from [2010Cr02](#), except as noted.

In the decay scheme of [2010Cr02](#),  $I_\beta$  sums to 84 9, missing  $I_\beta$  is suggestive of a neutron-branching contribution of 16 9.

 $^{54}\text{Ti}$  Levels

E(level) <sup>†</sup>	$J^\pi$	$T_{1/2}$
0	$0^+$	2.1 s 10
1495.76 25	$(2)^+$	
2498.2 4	$(4)^+$	
2516.83 25	$(2)^+$	
3000.4 4		
3338.7 6		
3461.5 5		

<sup>†</sup> From least-squares fit to  $E_\gamma$ 's. Reduced  $\chi^2=7.8$ , larger than critical  $\chi^2=3.8$ .

 $\beta^-$  radiations

E(decay)	E(level)	$I_\beta^{-\dagger}$	Log $ft$	Comments
$(8.5\times 10^3)$ 4)	3461.5	7 1	5.7 1	av $E\beta=3.70\times 10^3$ 20
$(8.7\times 10^3)$ 4)	3338.7	7 2	5.8 2	av $E\beta=3.76\times 10^3$ 20
$(9.0\times 10^3)$ 4)	3000.4	6 1	5.9 1	av $E\beta=3.93\times 10^3$ 20
$(9.5\times 10^3)$ 4)	2516.83	10 2	5.8 1	av $E\beta=4.17\times 10^3$ 20
$(9.5\times 10^3)$ 4)	2498.2	33 4	5.3 1	av $E\beta=4.18\times 10^3$ 20
$(1.05\times 10^4)$ 4)	1495.76	21 7	5.7 2	av $E\beta=4.67\times 10^3$ 20

<sup>†</sup> Absolute intensity per 100 decays.

$^{54}\text{Sc} \beta^-$  decay 2010Cr02 (continued) $\gamma(^{54}\text{Ti})$ 

I $\gamma$  normalization: Absolute  $\gamma$  intensities are given in 2010Cr02.

$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
484.6 4	4 1	3000.4		2516.83 (2) <sup>+</sup>		$E_\gamma$ : level-energy difference=483.5 3.
840.5 4	7 2	3338.7		2498.2 (4) <sup>+</sup>		
1002.0 5	40 4	2498.2	(4) <sup>+</sup>	1495.76 (2) <sup>+</sup>		$E_\gamma$ : From weighted average of 1002.4 3 (2010Cr01) and 1001.2 5 (2004Li75).
1020.8 4	9 2	2516.83	(2) <sup>+</sup>	1495.76 (2) <sup>+</sup>		
1495.0 3	79 5	1495.76	(2) <sup>+</sup>	0 0 <sup>+</sup>		$E_\gamma$ : level-energy difference=1495.7 3.
1504.0 3	2 1	3000.4		1495.76 (2) <sup>+</sup>		
1965.7 4	7 1	3461.5		1495.76 (2) <sup>+</sup>		
2517.5 3	5 1	2516.83	(2) <sup>+</sup>	0 0 <sup>+</sup>		$E_\gamma$ : level-energy difference=2516.8 3.

$^\dagger$  Absolute intensity per 100 decays.

 $^{54}\text{Sc} \beta^-$  decay 2010Cr02Decay Scheme

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

Legend

