^{70}Ga β^- decay

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal, E. A. Mccutchan	NDS 136, 1 (2016)	1-Jul-2016

Parent: ^{70}Ga: E=0.0; $J^\pi=1^+$; $T_{1/2}$=21.14 min *5*; Q(β^-)=1651.7 *15*; %β^- decay=99.59 *5*

1977Sc10: produced from ^{69}Ga(d,p) and ^{71}Ga(d,t) reactions (E_d = 10.4 MeV); natural target; NaI(Tl), Ge(Li), magnetic spectrometer, electron spectrometer, plastic scintillator. Measured: Iβ^-, Eγ, Iγ, $T_{1/2}$ using delayed β-e coin.

1975Bu07: obtained from deuteron bombardment of natural Ga target; Ge(Li) detector. Measured: Eγ, Iγ, $T_{1/2}$.

1958Ke20: source from ^{69}Ga(n,γ) reaction, using moderated neutrons; NaI(Tl) detector for γ-detection, plastic scintillator for β-detection. Measured $T_{1/2}$ of 1215 level with $\beta\gamma$ delayed coin.

1957Bu41: produced from ^{69}Ga(n,γ) reaction in an enriched target; NaI(Tl) detector, plastic scintillator and β spectrometer. Measured: Eγ, Iγ, $\gamma\gamma(\theta)$, $\beta\gamma$ coin, $T_{1/2}$.

1958Al01: source from neutron capture in enriched target; β spectrometer used for β conversion electron coin measurements. Measured: Iβ^-, ce β^- coin, $T_{1/2}$ of 1215 level with β^- conversion electron coin.

2012Kr07: source neutron irradiation of natural Ga target; neutrons from the pneumatic transfer facility of the Oregon State University TRIGA reactor. Ge detectors used for γ-detection. Measured: Eγ, Iγ.

Other: 2015DuZZ.

α: Additional information 1.

^{70}Ge Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	0^+		
1039.513 *10*	2^+		
1215.628 *16*	0^+	2.9 ns *4*	$T_{1/2}$: weighted average of 2.8 ns *8* (1958Ke20, using $\beta\gamma$ delayed-coincidence technique) and 3.0 ns *5* (1958Al01, using delayed β-e coincidences).

† From Eγ.

‡ From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(436.1 *15*)	1215.628	0.32 *1*	5.431 *15*	av Eβ=136.22 *55* E(decay): Other: 440 *20* from measurements of 1957Bu41. Iβ^-: Other: 0.305 *7* in 2012Kr07.
(612.2 *15*)	1039.513	0.36 *2*	5.895 *25*	av Eβ=202.29 *59* E(decay): Other: 610 *20* from measurements of 1957Bu41. Iβ^-: Other: 0.375 *7* in 2012Kr07.
(1651.7 *15*)	0.0	98.91 *6*	5.0925 *18*	av Eβ=647.96 *69* E(decay): Other: 1650 *10* from measurements of 1957Bu41.

† From 1977Sc10.

‡ Absolute intensity per 100 decays.

^{70}Ga β^- decay (continued)

$\gamma(^{70}Ge)$

Iγ normalization: Based on the following branching ratios of 1977Sc10 from β and γ counting in 4π geometry. β transitions: 98.91% *6* (g.s.), 0.36% *2* (1039), and 0.32% *1* (1215). ε transitions: 0.41% *6*.

E_γ [†]	I_γ [#&]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	α	$I_{(\gamma+ce)}$ [&]	Comments
176.115 *13*	0.29 *1*	1215.628	0^+	1039.513	2^+	E2	0.0893	0.32 *1*	ce(K)/(γ+ce)=0.0724 *10*; ce(L)/(γ+ce)=0.00827 *12*; ce(M)/(γ+ce)=0.001225 *18*; ce(N)/(γ+ce)=7.09×10^{-5} *10* α(K)=0.0788 *11*; α(L)=0.00900 *13*; α(M)=0.001335 *19*; α(N)=7.72×10^{-5} *11*
1039.513 *10*	0.65 *5*	1039.513	2^+	0.0	0^+	E2	3.23×10^{-4}		α(K)=0.000289 *4*; α(L)=2.96×10^{-5} *5*; α(M)=4.41×10^{-6} *7*; α(N)=2.88×10^{-7} *4*
1215[‡]		1215.628	0^+	0.0	0^+	E0		4×10^{-3} *3*	$I_{(\gamma+ce)}$: from I(γ+ce)(1215γ)/I(γ+ce)(176γ)=1.4×10^{-2} *7* (1958Al01). ce(K): from internal conversion electrons in coincidence with β^- (1958Al01).

[†] From 2012Kr07, unless otherwise stated.
[‡] From 1977Sc10.
[#] Derived by evaluators from measured β-feedings and measured relative intensity, I(1039)/I(176) = 2.30 *6* (assuming efficiency corrections applied), given in 1977Sc10.
[@] From the Adopted Gammas.
[&] Absolute intensity per 100 decays.

^{70}Ga β^- decay

Decay Scheme

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