

$^{58}\text{Cr} \beta^-$ decay (7.0 s) 1988Bo06

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Caroline D. Nesaraja, Scott D. Geraedts and Balraj Singh		NDS 111, 897 (2010)	12-Jan-2010

Parent: ^{58}Cr : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=7.0$ s 3; $Q(\beta^-)=4.07\times 10^3$ 21; $\% \beta^-$ decay=100.0

$^{58}\text{Cr}-Q(\beta^-)$: [Additional information 1](#).

$^{58}\text{Cr}-T_{1/2}$: from [1985Bo49](#). Other: 6 s ([1996Do23](#)).

[1988Bo06](#) (also [1985Bo49](#)) : $E=11.5$ MeV/nucleon, source produced by $W(^{76}\text{Ge},X)$, followed by on-line mass separation.

Measured E_γ , I_γ , $\gamma\gamma$, $\beta\gamma$ coin, $T_{1/2}$.

The decay scheme is considered as incomplete by the evaluators for two reasons: 1. feeding to g.s. is unknown, 2. highest populated level is at 810 keV while Q value is 4.1 MeV, there may be several missing transitions.

Note that in the 1997 NDS ([1997Bh02](#)), the excited states were shifted upwards due to interpretation of results in $(t, ^3\text{He})$ reaction.

[Additional information 2](#).

 ^{58}Mn Levels

E(level) [†]	J^π [‡]	Comments
0.0	1 ⁺	J^π : 3 ⁺ for g.s. was assumed by 1988Bo06 .
289.4 4	1 ⁺	
463.4 11	(0 to 3 ⁺)	
683.1 6	(0 to 3 ⁺)	
809.7 6	1 ⁺	

[†] From E_γ 's.

[‡] From 'Adopted Levels'.

 β^- radiations

E(decay)	E(level)	$I\beta^-$ [†]	Log ft	Comments
$(3.26\times 10^3$ 21)	809.7	≈ 92	≈ 4.0	av $E\beta=1.42\times 10^3$ 11
$(3.39\times 10^3$ [‡] 21)	683.1	<10	>5.0	av $E\beta=1.48\times 10^3$ 11
$(3.61\times 10^3$ [‡] 21)	463.4	<2	>5.9	av $E\beta=1.58\times 10^3$ 11
$(3.78\times 10^3$ [‡] 21)	289.4	<3	>5.8	av $E\beta=1.67\times 10^3$ 11
$(4.07\times 10^3$ [‡] 21)	0.0	≈ 30	≈ 4.9	av $E\beta=1.81\times 10^3$ 11
$I\beta^-$: experimental feeding is unknown. Value given here is based on log $ft \approx 4.9$ as for ^{58}Mn to ^{58}Fe g.s. to g.s. decay.				

[†] Absolute intensity per 100 decays.

[‡] Existence of this branch is questionable.

 $\gamma(^{58}\text{Mn})$

I_γ normalization: From $\Sigma(I_\gamma(289)+I_\gamma(682.9))=70$, assuming $I\beta(\text{g.s.})=30$ from log ft value of 4.9 for a similar transition in ^{58}Mn decay.

E_γ	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [†]	$\alpha^\#$	Comments
126 1	100 4	809.7	1 ⁺	683.1	(0 to 3 ⁺)	[D,E2]	0.10 8	I_γ : ≈ 1.5 6.
174 1	1.5 6	463.4	(0 to 3 ⁺)	289.4	1 ⁺			
289.5 4	25 1	289.4	1 ⁺	0.0	1 ⁺			

Continued on next page (footnotes at end of table)

⁵⁸Cr β⁻ decay (7.0 s) [1988Bo06](#) (continued)

γ(⁵⁸Mn) (continued)

<u>E_γ</u>	<u>I_γ[‡]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>
520.4 5	21 1	809.7	1 ⁺	289.4	1 ⁺
682.9 6	108 5	683.1	(0 to 3 ⁺)	0.0	1 ⁺

[†] From ‘adopted gammas’.

[‡] For absolute intensity per 100 decays, multiply by ≈0.53.

[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{58}\text{Cr} \beta^-$ decay (7.0 s) 1988Bo06

Decay Scheme

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

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- Coincidence

