

⁶⁴Cr β⁻ decay (42.9 ms) 2011Li50,2005Ga01,2003So21

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 178, 41 (2021).	12-Nov-2021

Parent: ⁶⁴Cr: E=0.0; J^π=0⁺; T_{1/2}=42.9 ms 10; Q(β⁻)=935×10¹ 30; %β⁻ decay=100.0

⁶⁴Cr-T_{1/2}: From ⁶⁴Cr Adopted Levels.

⁶⁴Cr-Q(β⁻): From 2021Wa16.

2011Li50: ⁶⁴Cr isotope produced in the fragmentation of 130 MeV/nucleon ⁸⁶Kr beam with ⁹Be target. Fragments separated using A1900 Fragment separator at NSCL-MSU and identified by time-of-flight and energy loss. Beta-counting system (BCS) was used to detect β and γ rays, the latter detected by SeGA array of 16 Ge detectors. Measured Eγ, Iγ, β, γ(implants) correlations and γγ coin.

2005Ga01, 2003So21,1999So20: ⁶⁴Cr produced in fragmentation of ⁷⁶Ge³⁰⁺ beam on a ⁵⁸Ni target. The LISE3 achromatic spectrometer used to separate fragments, with magnetic rigidity tuned to optimize transmission of ⁶²V and ⁶⁴Cr fragments. Transmitted nuclei were identified by three consecutive Si detectors, where two measured energy loss and time-of-flight, while the third determined their residual energies. Measured Eγ, Iγ, Iβ, γγ, βγ coin, γ(t), lifetimes using four Ge detectors placed around a thick Si telescope. Half-lives were determined by a fitting procedure that involved five parameters: half-lives of mother, daughter and grand-daughter nuclei, the β-efficiency and the background rate over the 1 s collection time.

The decay scheme is considered incomplete by the evaluators.

⁶⁴Mn Levels

E(level) [†]	J ^π [‡]	T _{1/2} [‡]	Comments
0.0	1 ⁽⁺⁾	90 ms 4	
186.4 3	(2 ⁺)		E(level): this level was first proposed by 2005GaZR.
1148.7 4	(1 ⁺)		

[†] From Eγ data.

[‡] From the Adopted Levels.

β⁻ radiations

E(decay)	E(level)	Iβ ⁻ ^{†‡}	Log ft	Comments
(8.2×10 ³ 3)	1148.7	≈8	≈4.7	av Eβ=3.82×10 ³ 15 Iβ ⁻ : 8 2 in 2011Li50.
(9.2×10 ³ # 3)	186.4	<3	>5.3	av Eβ=4.29×10 ³ 15
(9.4×10 ³ 3)	0.0	≈92	≈3.9	av Eβ=4.38×10 ³ 15 Iβ ⁻ : 92 2 in 2011Li50.

[†] Deduced by 2011Li50 from observed γ-ray intensities, absolute efficiency of SeGA array, β-detection efficiency and number of ions detected.

[‡] Absolute intensity per 100 decays.

Existence of this branch is questionable.

γ(⁶⁴Mn)

E _γ [†]	I _γ [‡]	E _i (level)	J _i ^π	E _f	J _f ^π	Comments
186.4 3	≈11	186.4	(2 ⁺)	0.0	1 ⁽⁺⁾	I _γ : ≈11 if no other γ transitions from the 186.4 and 1148.7 levels. Other: Eγ=189 1, Iγ=17% of the β strength (2002MaZN).
962.3 2	≈8	1148.7	(1 ⁺)	186.4	(2 ⁺)	I _γ : ≈8 from Iβ ⁻ if no other transition from this level.

Continued on next page (footnotes at end of table)

${}^{64}\text{Cr}$ β^- decay (42.9 ms) [2011Li50](#), [2005Ga01](#), [2003So21](#) (continued)

$\gamma({}^{64}\text{Mn})$ (continued)

† From [2011Li50](#).

‡ Absolute intensity per 100 decays.

$^{64}\text{Cr} \beta^-$ decay (42.9 ms) 2011Li50,2005Ga01,2003So21Decay SchemeIntensities: I_γ per 100 parent decays

Legend

