^{45}Ca β^- decay   **1965Fr12**

		History		
Type	Author		Citation	Literature Cutoff Date
Full Evaluation	T. W. Burrows		NDS 109, 171 (2008)	30-Oct-2007

Parent: ^{45}Ca: E=0.0; J^{π}=7/2$^-$; T$_{1/2}$=162.61 d *9*; Q(β^-)=255.8 *8*; %β^- decay=100.0

^{45}Ca-E,J^{π},T$_{1/2}$: From the ^{45}Ca Adopted Levels.

^{45}Ca-Q(β^-): From 2003Au03.

Measured ce's and β^-'s; iron-free toroidal β spect, anthracene. Others: 1994Ho35. See also 1983Bu21.

^{45}Sc Levels

All information is from the Adopted Levels.

E(level)	J^{π}	T$_{1/2}$
0.0	7/2$^-$	stable
12.40 *5*	3/2$^+$	325.8 ms *42*

β^- radiations

Iβ normalization: See footnote on Iγ and I(γ+ce).

Internal bremsstrahlung: see 1992Bu01.

Internal ionization and "shakeup" probabilities: see 1992Bu01.

E(decay)	E(level)	I$\beta^{-\dagger}$	Log *ft*	Comments
246 *2*	12.40	0.0019	10.3^{1u} +*1*−*2*	av Eβ=91.70 *31*
				Log *ft*: uniqueness from ΔJ^{π}.
258 *2*	0.0	99.9981	6.0	av Eβ=76.86 *28*
				Allowed shape from Fermi-Kurie plot (1950Ma03, 1950Ke60, 1967Ha39). No deviation of longitudinal polarization from -v/c (1988Ga16. Mott analyzer, Wien filter).

† Absolute intensity per 100 decays.

γ(^{45}Sc)

All information is from the Adopted Gammas, except as noted.

E$_{\gamma}{}^{\dagger}$	I$_{\gamma}{}^{\ddagger\#}$	E$_i$(level)	J_i^{π}	E$_f$	J_f^{π}	Mult.	$\alpha^{@}$	I$_{(\gamma+ce)}{}^{\ddagger\#}$	Comments
12.40 *5*	4.5×10^{-6}	12.40	3/2$^+$	0.0	7/2$^-$	(M2)	423 *9*	1.9×10^{-3}	ce(K)/(γ+ce)=0.855 *10*; ce(L)/(γ+ce)=0.126 *4*; ce(M)/(γ+ce)=0.0156 *5*; ce(N)/(γ+ce)=0.000703 *22* α(K)=362 *8*; α(L)=53.5 *12*; α(M)=6.63 *15*; α(N)=0.298 *7* ΔIγ=+17-7; ΔI(γ+ce)=+11-4; ce(K)=0.0014 +*8*−*3*; K/L>2 E$_{\gamma}$: from level energy. Other: 12.47 +*14*−*30* from E(K-electron)=7.97 keV +*14*−*30*. Comment added B. Singh, May 01, 2021. I$_{\gamma}$: from I(γ+ce) and α. Iγ value modified and comment added by B. Singh, May 01, 2021.

<u>^{45}Ca β^- **decay**   **1965Fr12** **(continued)**</u>

<u>$\gamma(^{45}$Sc$)$ (continued)</u>

E$_\gamma$†	E$_i$(level)	Comments
		α: from BrIcc for M2. Other: 501 *43* from α(K)exp=428 *37*, and α=1.17(α(K)exp), the ratio of total α/α(K) (theory) from BrIcc. 2008Bu01 evaluation used K/L+=3. Comment added by B. Singh, May 01, 2021.

† From E(K-electron)=7.97 keV *+14−30*.

‡ From I(ce$_K$)/Iβ=1.4×10^{-5} *+8−3* and adopted α(K)exp=474 *53* assuming that ce(K)/ce(L)+=3 to obtain I(γ+ce). 1965Fr12 obtained I(γ+ce)=1.7×10^{-3} *8* from I(ce$_K$)/Iβ=1.4×10^{-5} *+8−3* by assuming that the 12.7γ is M2 and that ce(K)/ce(L)>2.

$^\#$ Absolute intensity per 100 decays.

$^@$ 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.

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Decay Scheme

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

7/2$^-$ 0.0   162.61 d *9*

Q$_{\beta^-}$=255.8 *8*   %β^-=100

$^{45}_{20}$Ca$_{25}$

Iβ^- Log *ft*

0.0019   10.3^{1u} 3/2$^+$ 12.40   325.8 ms *42*

12.40 (M2) 0.0019

99.9981 6.0   7/2$^-$ 0.0   stable

$^{45}_{21}$Sc$_{24}$