# $^{169}$Er $\beta^-$ decay 1968Ca06,1970Sh09

| History | | | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | Coral M. Baglin | NDS 109, 2033 (2008) | 15-Jun-2008 |

Parent: $^{169}$Er: E=0.0; $J^\pi=1/2^-$; $T_{1/2}$=9.392 d *18*; Q($\beta^-$)=351.3 *11*; %$\beta^-$ decay=100.0

Others: 1948Ke11, 1951Ke44, 1956Bi30, 1956Ha72, 1959Ch31, 1963Mc13, 1965Du02, 1967Ma42, 1971MaXG.

Except for the ce and I$\beta$ data reported here, transition data were obtained with $^{169}$Yb sources (see $^{169}$Yb $\varepsilon$ decay (32.018 d) for details and additional data).

For K-shell auto-ionization probability data, see 1968Er02, 1971Ca44, and 1974Ja31; for theoretical calculations, see 1972La07, 1972La09, 1972Mo26, 1975La20, 1977Is05, and 1981Mu14.

For internal bremsstrahlung data, see 1976Pr06.

## $^{169}$Tm Levels

| E(level)† | $J^\pi$‡ | $T_{1/2}$‡ | Comments |
|---|---|---|---|
| 0.0 | $1/2^+$ | stable | |
| 8.41017 *15* | $3/2^+$ | 4.09 ns *5* | $T_{1/2}$: datum from $\beta^-$ decay: 4.34 ns *17* (1963Mc13; however, see comment on this datum In Adopted Levels). |
| 118.18945 *11* | $5/2^+$ | 62 ps *3* | |

† From recoil-corrected E$\gamma$.

‡ From Adopted Levels.

## $\beta^-$ radiations

$\beta^-$ feedings are from intensity imbalance at each level; g.s. feeding is from 100% less total I$\beta$ to 8.4+118.2 levels.

1965Du02 report E$\beta$=344 keV *3* for $\beta$ group to the g.s. and 8.4 levels combined.

| E(decay) | E(level) | I$\beta^-$† | Log *ft* | Comments |
|---|---|---|---|---|
| (233.1 *11*) | 118.18945 | 0.0048 *10* | $9.54^{1u}$ *9* | av E$\beta$=74.14 *37* |
| (342.9 *11*) | 8.41017 | 45 *5* | 6.49 *5* | av E$\beta$=98.27 *36* |
| (351.3 *11*) | 0.0 | 55 *5* | 6.44 *4* | av E$\beta$=100.96 *36* |

† Absolute intensity per 100 decays.

## $^{169}$Er $\beta^-$ decay 1968Ca06,1970Sh09 (continued)

### $\gamma(^{169}Tm)$

Iγ normalization: from I(γ+ce)/Σ Iβ measurements.

| $E_\gamma$ [†] | $I_\gamma$ [#a] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[‡] | δ[‡] | α[b] | $I_{(\gamma+ce)}$ [a] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 8.41017 *15* | 0.170 *19* | 8.41017 | 3/2+ | 0.0 | 1/2+ | M1+E2 | 0.0328 *5* | 263 *5* | 45[@] *5* | ce(M)/(γ+ce)=0.789 *9*; ce(N+)/(γ+ce)=0.207 *5*<br>ce(N)/(γ+ce)=0.182 *5*; ce(O)/(γ+ce)=0.0240 *6*;<br>ce(P)/(γ+ce)=0.000899 *21*<br>Mult.,δ: from M1:M2:M3 In 1968Ca06.<br>$E_\gamma$: from level energy difference.<br>M1:M2:M3:M4:M5:N1:N2:N3:(N4+N5):O1:<br>(O2+O3)= 100:36.8 *14*:38.0 *14*:0.9 *2*:1.0 *2*:22.1<br>*6*:6.4 *3*:7.6 *2*:0.20 *2*: 3.7 *1*:2.08 *6* (1968Ca06);<br>M1:M2:M3:(M4+M5)=100:31 *3*:34 *3*:≈1.2,<br>N1:N2:N3=100:25 *3*:41 *5*, M/N=4.2 *5*, N/O=6.4<br>*10* (1971MaXG). Other: (α(M)exp +<br>α(N)exp)=106 *6* (from βce coin (1959Ch31));<br>value is inconsistent with adopted multipolarity. |
| 109.77924 *4* | 0.0013 *3* | 118.18945 | 5/2+ | 8.41017 | 3/2+ | M1+E2 | −0.139 *10* | 2.37 | 0.0044[&] *10* | ce(K)/(γ+ce)=0.583 *5*; ce(L)/(γ+ce)=0.0932 *16*;<br>ce(M)/(γ+ce)=0.0209 *4*;<br>ce(N+)/(γ+ce)=0.00561 *11*<br>ce(N)/(γ+ce)=0.00488 *9*; ce(O)/(γ+ce)=0.000693<br>*13*; ce(P)/(γ+ce)=3.57×10$^{-5}$ *7* |
| 118.18940 *14* | 0.00014 *3* | 118.18945 | 5/2+ | 0.0 | 1/2+ | E2 | | 1.642 | 0.00037[&] *8* | ce(K)/(γ+ce)=0.265 *4*; ce(L)/(γ+ce)=0.273 *4*;<br>ce(M)/(γ+ce)=0.0666 *11*;<br>ce(N+)/(γ+ce)=0.0169 *3*<br>ce(N)/(γ+ce)=0.01515 *25*; ce(O)/(γ+ce)=0.00177<br>*3*; ce(P)/(γ+ce)=1.117×10$^{-5}$ *19* |

[†] From Adopted Gammas.
[‡] From Adopted Gammas, except As noted.
[#] Deduced from I(γ+ce) and α.
[@] From Ice(8.4γ)/Σ Iβ=45 *5* (Ice≈I(γ+ce)) (1965Du02). Other value for this ratio: 42 *1* (1959Ch31).
[&] From Ti(109.8γ+118.2γ)/Σ Iβ=0.0048 *10* (1970Sh09) and adopted γ-ray branching from 118.2 level.
[a] Absolute intensity per 100 decays.
[b] 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.





$^{169}_{69}Tm_{100}$-2

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### Decay Scheme

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