# $^{152}$Yb ε decay 1987To02,1988BaZS

| History | | | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | M. J. Martin | NDS 114, 1497 (2013) | 31-Aug-2013 |

Parent: $^{152}$Yb: E=0; $J^\pi=0^+$; $T_{1/2}$=3.03 s *6*; Q(ε)=5.45×10$^3$ *14*; %ε+%$\beta^+$ decay=100.0

Other: 2011Es03 deduced ε+$\beta^+$ feedings using total absorption spectroscopy. From coincidences with x-rays and $\beta^+$ the authors can deduce the ε and $\beta^+$ fractions separately. These results are given in comments.

## $^{152}$Tm Levels

Measured: γ, $\gamma^\pm$, γγ, γβ+ (1987To02), γ, γγ (1982No13), γ, $\gamma^\pm$, K x ray (1984HaZD); γ, ce (1988BaZS,1989KlZX).
Calculation of Gamow-Teller $\beta^+$ decay (1988Ku20,1988Su04,1989KlZX).

| E(level) | $J^\pi$[†] |
|---|---|
| 0.0 | $(2)^-$ |
| 141.7 | $1^+$ |
| 458.6 | $1^+$ |
| 482.4 | $(1)^+$ |
| 968 | $1^+$ |
| 1090.9 | $1^+$ |

[†] From Adopted Levels.

## ε,$\beta^+$ radiations

| E(decay) | E(level) | Iβ+ [†] | Iε[†] | Log *ft* | I(ε+β+)[†] | Comments |
|---|---|---|---|---|---|---|
| (4.36×10$^3$ *14*) | 1090.9 | 0.4 *2* | 0.4 *1* | 5.32 *19* | 0.8 *3* | av Eβ=1521 *93*; εK=0.38 *4*; εL=0.058 *6*; εM+=0.0173 *18*<br>Iε,I(ε+β+): I(ε)=0.9 *2* and I(ε+β+)=2.0 *3* (2011Es03). |
| (4.48×10$^3$ *14*) | 968 | 0.30 *6* | 0.22 *5* | 5.56 *12* | 0.52 *9* | av Eβ=1577 *93*; εK=0.35 *4*; εL=0.054 *6*; εM+=0.0163 *17*<br>Iε,I(ε+β+): I(ε)=0.4 *2* and I(ε+β+)=0.9 *5* (2011Es03). |
| (4.97×10$^3$ *14*) | 482.4 | 58 *3* | 29 *3* | 3.52 *8* | 87.2 *5* | av Eβ=1802 *93*; εK=0.28 *3*; εL=0.043 *5*; εM+=0.0128 *14*<br>E(decay): other: Eβ+≈4.0 MeV from (β+)(482γ) (1987To02); E(ε)=4570 *+180−150* from ε/β+ (1984HaZD).<br>Iε,I(ε+β+): I(ε)=30 *3* and I(ε+β+)=89 *2* (2011Es03) for the 459 and 482 levels. |
| (4.99×10$^3$ *14*) | 458.6 | 5.4 *5* | 2.6 *4* | 4.57 *9* | 8.0 *6* | av Eβ=1813 *93*; εK=0.28 *3*; εL=0.042 *5*; εM+=0.0127 *14* |
| (5.31×10$^3$ *14*) | 141.7 | 2.5 *7* | 1.0 *3* | 5.05 *14* | 3.5 *9* | av Eβ=1961 *94*; εK=0.237 *24*; εL=0.036 *4*; εM+=0.0109 *12* |

[†] Absolute intensity per 100 decays.

## γ($^{152}$Tm)

Iγ normalization: ΣI(γ+ce)(to g.s.)=100. From log $f^{1u}t$>8.5 one gets I(ε+$\beta^+$)<0.08% for the branch to the g.s.
K x ray/I(482γ)=0.30 *3* (1987To02).

Continued on next page (footnotes at end of table)

## $^{152}$Yb ε decay 1987To02,1988BaZS (continued)

### γ($^{152}$Tm) (continued)

| $E_\gamma$[†] | $I_\gamma$[†#] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. | α[@] | Comments |
|---|---|---|---|---|---|---|---|---|
| 141.61 *17* | 13.0 *5* | 141.7 | $1^+$ | 0.0 | $(2)^-$ | E1 | 0.1329 | α(K)=0.1109 *16*; α(L)=0.01717 *25*; α(M)=0.00382 *6*; α(N+..)=0.001004 *15*<br>α(N)=0.000880 *13*; α(O)=0.0001190 *17*; α(P)=5.19×10$^{-6}$ *8*<br>Mult.: α(K)exp=0.071 *45* (1988BaZS); theory: α(K)=0.112. |
| 316.75 *15* | 8.2 *6* | 458.6 | $1^+$ | 141.7 | $1^+$ | (M1) | 0.1253 | α(K)=0.1053 *15*; α(L)=0.01560 *22*; α(M)=0.00347 *5*; α(N+..)=0.000935 *14*<br>α(N)=0.000812 *12*; α(O)=0.0001170 *17*; α(P)=6.38×10$^{-6}$ *9*<br>Mult.: α(K)exp=0.130 *35* (1988BaZS); theory: α(K)=0.108. |
| 482.32 *9* | 100 | 482.4 | $(1)^+$ | 0.0 | $(2)^-$ | E1 | 0.00630 | α(K)=0.00534 *8*; α(L)=0.000755 *11*; α(M)=0.0001669 *24*; α(N+..)=4.46×10$^{-5}$ *7*<br>α(N)=3.88×10$^{-5}$ *6*; α(O)=5.49×10$^{-6}$ *8*; α(P)=2.83×10$^{-7}$ *4*<br>Mult.: α(K)exp=0.0066 *25* (1988BaZS); theory: α(K)=0.00534. |
| 827.0[‡] *3* | 0.6[‡] *1* | 968 | $1^+$ | 141.7 | $1^+$ | | | |
| 949.13 *17* | 0.9 *3* | 1090.9 | $1^+$ | 141.7 | $1^+$ | | | |

[†] Weighted average of measurements from 1988BaZS and 1987To02.
[‡] From 1988BaZS.
[#] For absolute intensity per 100 decays, multiply by 0.867 *5*.
[@] 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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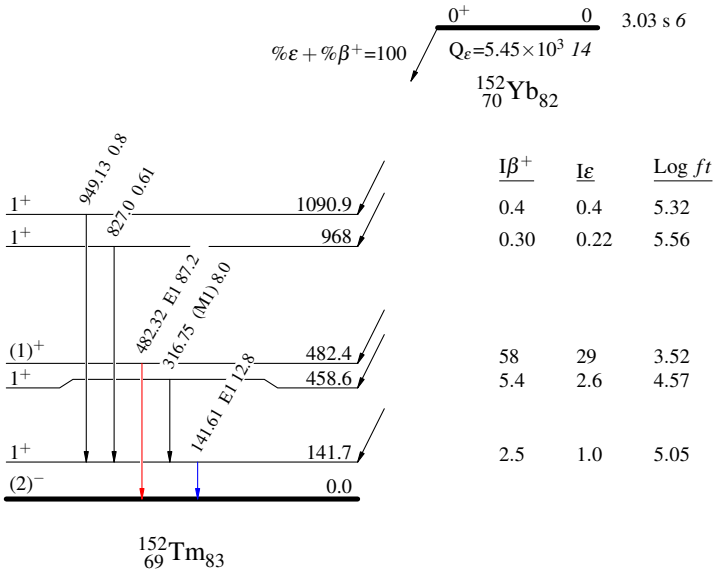
### Decay Scheme

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

Legend

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




| | Iβ+ | Iε | Log *ft* |
|---|---|---|---|
| 1090.9 | 0.4 | 0.4 | 5.32 |
| 968 | 0.30 | 0.22 | 5.56 |
| 482.4 | 58 | 29 | 3.52 |
| 458.6 | 5.4 | 2.6 | 4.57 |
| 141.7 | 2.5 | 1.0 | 5.05 |