

**$^{151}\text{Tm}$  IT decay (0.451  $\mu\text{s}$ )    [1987McZZ](#),[1982He08](#),[1982No13](#)**

| Type            | Author       | History<br>Citation | Literature Cutoff Date |
|-----------------|--------------|---------------------|------------------------|
| Full Evaluation | Balraj Singh | NDS 110, 1 (2009)   | 20-Nov-2008            |

Parent:  $^{151}\text{Tm}$ : E=2655.67 22;  $J^\pi=(27/2^-)$ ;  $T_{1/2}=0.451 \mu\text{s}$  34; %IT decay=100.0

[1987McZZ](#):  $^{96}\text{Ru}(^{58}\text{Ni},3\text{p})$  E=255 MeV. Measured  $\gamma$ ,  $\gamma\gamma$ ,  $\gamma\gamma(t)$ , recoil-catcher method.

[1982He08](#):  $^{95}\text{Mo}(^{58}\text{Ni},\text{pn}\gamma)$  and  $^{93}\text{Nb}(^{60}\text{Ni},2\text{n}\gamma)$  E=225-285 MeV. Measured  $\gamma$ ,  $\gamma\gamma$ ,  $\gamma\gamma(t)$ . They identified a set of negative parity states and interpreted these as  $\pi h_{11/2}^5$  yrast levels.

[1982No13](#):  $^{96}\text{Ru}(^{58}\text{Ni},3\text{p}\gamma)$  E=238-250 MeV. Measured  $\gamma$ ,  $\gamma\gamma$ .

Other: [1984ChZS](#).

 $^{151}\text{Tm}$  Levels

| E(level) <sup>†</sup> | $J^\pi$ <sup>‡</sup> | $T_{1/2}$              | Comments                                                                                                                                                                                                                            |
|-----------------------|----------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.0                   | (11/2 <sup>-</sup> ) |                        | E(level): see <a href="#">1990Ak01</a> (also <a href="#">1993To07</a> ) for assignment of 11/2 <sup>-</sup> as the g.s. of $^{151}\text{Tm}$ from systematics in this region. The $s_{1/2}$ state is predicted at $\approx 50$ keV. |
| 1477.60 10            | (15/2 <sup>-</sup> ) |                        |                                                                                                                                                                                                                                     |
| 1489.83 18            | (15/2 <sup>+</sup> ) |                        |                                                                                                                                                                                                                                     |
| 1905.64? 13           | (19/2 <sup>+</sup> ) |                        | E(level): the position of this level is uncertain because the ordering of the 415-393 $\gamma$ -ray cascade is tentative.                                                                                                           |
| 2176.48 19            | (19/2 <sup>-</sup> ) |                        |                                                                                                                                                                                                                                     |
| 2299.55 20            | (23/2 <sup>+</sup> ) |                        |                                                                                                                                                                                                                                     |
| 2515.27 20            | (23/2 <sup>-</sup> ) |                        |                                                                                                                                                                                                                                     |
| 2655.67 22            | (27/2 <sup>-</sup> ) | 0.451 $\mu\text{s}$ 34 | %IT=100<br>$T_{1/2}$ : from $\gamma\gamma(t)$ ; weighted average of 470 ns 50 ( <a href="#">1982He08</a> ) 420 ns 40 ( <a href="#">1982No13</a> ) and 466 ns 34 ( <a href="#">1987McZZ</a> ).                                       |

<sup>†</sup> Relative to the (11/2<sup>-</sup>) isomer.

<sup>‡</sup> From 'Adopted Levels', where assignments were based on theoretical considerations: the negative parity states are well described by the  $\pi h_{11/2}^5$  yrast levels. The positive parity levels are assumed to have an  $h_{11/2}$  proton coupled to a 3<sup>-</sup>, 5<sup>-</sup>, 7<sup>-</sup> core.

 $\gamma(^{151}\text{Tm})$ 

| $E_\gamma$ <sup>†</sup> | $I_\gamma$ <sup>@</sup> | $E_i(\text{level})$ | $J_i^\pi$            | $E_f$    | $J_f^\pi$            | Mult. <sup>#</sup> | $\alpha$ <sup>&amp;</sup> | Comments                                                                                                                                                                                            |
|-------------------------|-------------------------|---------------------|----------------------|----------|----------------------|--------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 140.4 1                 | 64 4                    | 2655.67             | (27/2 <sup>-</sup> ) | 2515.27  | (23/2 <sup>-</sup> ) | E2                 | 0.880                     | Mult.: from $\alpha(\text{exp})=0.89$ 26 ( <a href="#">1984ChZS</a> ) and $\alpha(\text{exp})=0.80$ 7 ( <a href="#">1987McZZ</a> ). $\alpha(\text{exp})$ values are deduced from intensity balance. |
| 215.7 2                 | 14 1                    | 2515.27             | (23/2 <sup>-</sup> ) | 2299.55  | (23/2 <sup>+</sup> ) |                    |                           | $\alpha(\text{exp})=0.071$ 7 from intensity balance ( <a href="#">1987McZZ</a> ). It is consistent with E1 implied by level spins, but does not rule out E2.                                        |
| 338.8 1                 | 98 5                    | 2515.27             | (23/2 <sup>-</sup> ) | 2176.48  | (19/2 <sup>-</sup> ) |                    |                           |                                                                                                                                                                                                     |
| 393.9 <sup>‡</sup> 1    | 15 1                    | 2299.55             | (23/2 <sup>+</sup> ) | 1905.64? | (19/2 <sup>+</sup> ) |                    |                           |                                                                                                                                                                                                     |
| 415.8 <sup>‡</sup> 1    | 15 1                    | 1905.64?            | (19/2 <sup>+</sup> ) | 1489.83  | (15/2 <sup>+</sup> ) |                    |                           |                                                                                                                                                                                                     |
| 698.8 2                 | 103 5                   | 2176.48             | (19/2 <sup>-</sup> ) | 1477.60  | (15/2 <sup>-</sup> ) |                    |                           |                                                                                                                                                                                                     |
| 1477.7 1                | 100 5                   | 1477.60             | (15/2 <sup>-</sup> ) | 0.0      | (11/2 <sup>-</sup> ) |                    |                           |                                                                                                                                                                                                     |
| 1489.8 2                | 15 1                    | 1489.83             | (15/2 <sup>+</sup> ) | 0.0      | (11/2 <sup>-</sup> ) |                    |                           |                                                                                                                                                                                                     |

<sup>†</sup> From [1987McZZ](#). Their values agree well with those from [1982No13](#).

<sup>‡</sup> Ordering of 415-393 cascade is tentative.

<sup>#</sup> From  $\gamma(\theta)$  in [1987McZZ](#), except for the 140-keV G.

<sup>@</sup> For absolute intensity per 100 decays, multiply by 0.87 4.

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

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**Decay Scheme**

**Legend**

Intensities:  $I_{(\gamma+ce)}$  per 100 parent decays  
%IT=100.0

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

