

$^{142}\text{Tb}$  IT decay (303 ms) 2006Ta08

| Type            | Author                                                     | History | Citation             | Literature Cutoff Date |
|-----------------|------------------------------------------------------------|---------|----------------------|------------------------|
| Full Evaluation | T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli |         | NDS 112, 1949 (2011) | 1-Jun-2010             |

Parent:  $^{142}\text{Tb}$ : E=279.8 4;  $J^\pi=5^-$ ;  $T_{1/2}=303$  ms 17; %IT decay=100.0

$^{142}\text{Tb}$  isotope formed by  $^{92}\text{Mo}(^{54}\text{Fe},n3p)$  reaction at 250 MeV. The recoil products were separated in mass/charge ratio by recoil-mass separator (RMS). Measured  $E_\gamma$ ,  $I_\gamma$ ,  $\gamma\gamma$ , conversion electrons using two segmented Ge clover detectors for  $\gamma$  rays and Si(Li) conversion electron spectrometer (BESCA) at Oak Ridge HRIBF.

1991Fi03: measured  $\gamma$ ,  $\gamma\gamma$ , X $\gamma$ , Xp,  $T_{1/2}$ .

 $^{142}\text{Tb}$  Levels

| E(level) | $J^\pi$ | $T_{1/2}$ | Comments                                                                                                                                            |
|----------|---------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 0        | $1^+$   |           |                                                                                                                                                     |
| 181.8 3  | $2^+$   |           |                                                                                                                                                     |
| 211.5 3  | $3^+$   |           |                                                                                                                                                     |
| 279.7 5  | $5^-$   | 303 ms 17 | $T_{1/2}$ : 1991Fi03 give 303 ms 17 in the abstract but 303 ms 7 in the paper, the latter is a misprint (as per priv comm from one of the authors). |

 $\gamma(^{142}\text{Tb})$ 

$I_\gamma$  normalization: from %IT=100.

$I_\gamma$  normalization: Calculated using relative intensities from 2006TA08 and internal conversion coefficients from BrIcc.

Theoretical conversion coefficients are from BrIcc code.

| $E_\gamma$ | $I_\gamma^\ddagger$ | $E_i(\text{level})$ | $J^\pi_i$ | $E_f$ | $J^\pi_f$ | Mult. | $\alpha^\ddagger$    | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------|---------------------|---------------------|-----------|-------|-----------|-------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29.9# 9    | <0.1                | 211.5               | $3^+$     | 181.8 | $2^+$     | M1+E2 | $2.5 \times 10^2$ 25 | ce(L)/( $\gamma$ +ce)=0.8 5; ce(M)/( $\gamma$ +ce)=0.18 23;<br>ce(N+)/( $\gamma$ +ce)=0.05 6<br>ce(N)/( $\gamma$ +ce)=0.04 6; ce(O)/( $\gamma$ +ce)=0.005 7;<br>ce(P)/( $\gamma$ +ce)= $1.1 \times 10^{-5}$ 13<br>Mult.: (M1) shown in figure 15 of 2006Ta08.<br>Mult.: M1 <sup>+</sup> (6 $\pm$ 3)%E2 from $I_\gamma(29.7\gamma)/I_\gamma(68.5\gamma)$<br>In 181.9 $\gamma$ gated spectrum (1991Fi03).<br>$\alpha(\text{exp})=98+23-10$<br>$\alpha(\text{K})_{\text{exp}}=61$ 5 (1991Fi03)<br>ce(K)/( $\gamma$ +ce)=0.697 12; ce(L)/( $\gamma$ +ce)=0.225 7;<br>ce(M)/( $\gamma$ +ce)=0.0533 17; ce(N+)/( $\gamma$ +ce)=0.0143 5<br>ce(N)/( $\gamma$ +ce)=0.0124 4; ce(O)/( $\gamma$ +ce)=0.00183 6;<br>ce(P)/( $\gamma$ +ce)=0.000100 4<br>$I_{(\gamma+ce)}$ : 119 +30-16 (2006Ta08).<br>Mult.: E3 shown in figure 15 of 2006Ta08 seems a misprint. |
| 68.2 3     | 1.20 10             | 279.7               | $5^-$     | 211.5 | $3^+$     | M2    | 90.9 21              | $\alpha(\text{exp})<180$ ; $\alpha(\text{L})_{\text{exp}}<2$<br>ce(K)/( $\gamma$ +ce)=0.087 5; ce(L)/( $\gamma$ +ce)=0.68 3;<br>ce(M)/( $\gamma$ +ce)=0.170 12; ce(N+)/( $\gamma$ +ce)=0.043 4<br>ce(N)/( $\gamma$ +ce)=0.038 3; ce(O)/( $\gamma$ +ce)=0.0048 4;<br>ce(P)/( $\gamma$ +ce)= $6.6 \times 10^{-6}$ 5<br>Mult.: M2 shown in figure 15 of 2006Ta08 seems a misprint.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 98.3# 9    | <0.07               | 279.7               | $5^-$     | 181.8 | $2^+$     | E3    | 48 3                 | $\alpha(\text{exp})<180$ ; $\alpha(\text{L})_{\text{exp}}<2$<br>ce(K)/( $\gamma$ +ce)=0.087 5; ce(L)/( $\gamma$ +ce)=0.68 3;<br>ce(M)/( $\gamma$ +ce)=0.170 12; ce(N+)/( $\gamma$ +ce)=0.043 4<br>ce(N)/( $\gamma$ +ce)=0.038 3; ce(O)/( $\gamma$ +ce)=0.0048 4;<br>ce(P)/( $\gamma$ +ce)= $6.6 \times 10^{-6}$ 5<br>Mult.: M2 shown in figure 15 of 2006Ta08 seems a misprint.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 181.8 3    | 10 4                | 181.8               | $2^+$     | 0     | $1^+$     | M1+E2 | 0.36 5               | $\alpha(\text{K})_{\text{exp}}=0.2$ 1; $\alpha(\text{L})_{\text{exp}}=0.07$ 1; K/L=3.1 3<br>ce(K)/( $\gamma$ +ce)=0.20 4; ce(L)/( $\gamma$ +ce)=0.049 12;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Continued on next page (footnotes at end of table)

**$^{142}\text{Tb}$  IT decay (303 ms)    2006Ta08 (continued)** $\gamma(^{142}\text{Tb})$  (continued)

| $E_\gamma$ | $I_\gamma^\ddagger$ | $E_i(\text{level})$ | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. | $\alpha^\dagger$ | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------|---------------------|---------------------|-----------|-------|-----------|-------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 211.5 3    | 100 6               | 211.5               | $3^+$     | 0     | $1^+$     | E2    | 0.190            | ce(M)/( $\gamma$ +ce)=0.011 4; ce(N+)/( $\gamma$ +ce)=0.0029 8<br>ce(N)/( $\gamma$ +ce)=0.0025 7; ce(O)/( $\gamma$ +ce)=0.00036 8;<br>ce(P)/( $\gamma$ +ce)= $1.4 \times 10^{-5}$ 5<br>$\alpha(\text{K})_{\text{exp}}=0.11$ 1; $\alpha(\text{L})_{\text{exp}}=0.04$ 1; K/L=2.6 1<br>ce(K)/( $\gamma$ +ce)=0.1114 15; ce(L)/( $\gamma$ +ce)=0.0375 6;<br>ce(M)/( $\gamma$ +ce)=0.00871 14; ce(N+)/( $\gamma$ +ce)=0.00224 4<br>ce(N)/( $\gamma$ +ce)=0.00197 3; ce(O)/( $\gamma$ +ce)=0.000268 4;<br>ce(P)/( $\gamma$ +ce)= $6.45 \times 10^{-6}$ 10 |

<sup>†</sup> Additional information 1.<sup>‡</sup> For absolute intensity per 100 decays, multiply by 0.889 75.

# Placement of transition in the level scheme is uncertain.

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## Decay Scheme

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

## Legend

- $\longrightarrow$   $I_\gamma < 2\% \times I_\gamma^{\text{max}}$   
 $\longrightarrow$   $I_\gamma < 10\% \times I_\gamma^{\text{max}}$   
 $\longrightarrow$   $I_\gamma > 10\% \times I_\gamma^{\text{max}}$   
 $-----\longrightarrow$   $\gamma$  Decay (Uncertain)

