

$^{187}\text{Bi}$   $\alpha$  decay (38 ms)    [2006An11](#),[1999Ba45](#),[1984ScZQ](#)

| Type            | Author          | History<br>Citation | Literature Cutoff Date |
|-----------------|-----------------|---------------------|------------------------|
| Full Evaluation | Coral M. Baglin | NDS 134, 149 (2016) | 15-Apr-2015            |

Parent:  $^{187}\text{Bi}$ :  $E=0.0$ ;  $J^\pi=(9/2^-)$ ;  $T_{1/2}=38$  ms 3;  $Q(\alpha)=7779$  4;  $\% \alpha$  decay  $\approx 100.0$

$^{187}\text{Bi}$ - $T_{1/2}$ : Unweighted average of 40 ms 2 ([2006An11](#);  $7000\alpha(t)$ ), 32 ms 3 ([1999Ba45](#);  $7000\alpha(t)$ ), 45 ms 11 ([2002Hu14](#);  $7000\alpha(t)$ ) and 35 ms 4 ([1984ScZQ](#);  $6986\alpha(t)$ ). others: 35 ms  $+14-8$  ( $6994\alpha(t)$  and  $7605\alpha(t)$ ; [2003Ke08](#)), 25 ms  $+9-5$  ( $7612\alpha(t)$ ; [1999Ba45](#)), 21 ms  $+29-8$  ( $7367\alpha(t)$ ; [1999Ba45](#)). calculation (Coulomb and proximity potential model): [2012Ja14](#).

[Additional information 1.](#)

[2006An11](#):  $^{187}\text{Bi}$  source from  $^{144}\text{Sm}(^{46}\text{Ti},\text{p}2\text{N})$  reaction at  $E(^{46}\text{Ti})=224$  MeV 1 (production  $\sigma=0.20$   $\mu\text{b}$  8); evaporation residues separated by SHIP velocity filter and implanted into position-sensitive Si detector; using 6 Si BOX detectors, 3 time of flight detectors, a veto detector and a four-fold segmented Clover Ge detector; measured  $E\alpha$ ,  $I\alpha$ , (recoil)- $\gamma$  coin,  $\alpha$ - $\gamma$  coin.

[1999Ba45](#): source from  $^{97}\text{Mo}(^{92}\text{Mo},\text{pn})$ ,  $E=420$  MeV, 93%  $^{97}\text{Mo}$  target; recoils identified using fragment mass analyzer and gas-filled parallel-grid avalanche counter, then implanted in double-sided Si strip detector; measured  $E\alpha$ ,  $I\alpha$ , recoil- $\alpha(t)$ .

For discussion of competition between p and  $\alpha$  decay see [2014Wa16](#) (generalized liquid drop model).

For this decay,  $Q_{\text{xBR}}=7779$  4.

 $^{183}\text{Tl}$  Levels

| E(level) | $J^\pi^\dagger$     | Comments                                                                                                                                                                                                                                                  |
|----------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.0      | (1/2 <sup>+</sup> ) |                                                                                                                                                                                                                                                           |
| 273? 1   | (3/2 <sup>+</sup> ) | E(level): from $E\gamma$ .                                                                                                                                                                                                                                |
| 628.7    | (9/2 <sup>-</sup> ) | E(level): from private communication from A.N. Andreyev to authors of <a href="#">2011Ve01</a> , uncertainty unstated by <a href="#">2011Ve01</a> . $E=625$ 7 from energy difference between $\alpha$ group feeding this state and that feeding the g.s.. |

<sup>†</sup> From Adopted Levels.

 $\alpha$  radiations

| $E\alpha$                | E(level) | $I\alpha^\dagger@$ | $\text{HF}^\ddagger$ | Comments                                                                                                                                                                                                                                                                                      |
|--------------------------|----------|--------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7000 <sup>#</sup> 5      | 628.7    | 88.0 9             | $\approx 0.47$       | $E\alpha$ : from <a href="#">2006An11</a> . other: 7000 8 ( <a href="#">1999Ba45</a> ), 6986 10 ( <a href="#">1984ScZQ</a> ). This $\alpha$ is correlated with 6380 $\alpha$ from $^{183}\text{Tl}$ decay. Reduced $\alpha$ width $\delta_\alpha^2=0.075$ keV 5 ( <a href="#">2006An11</a> ). |
| 7342 <sup>&amp;</sup> 15 | 273?     | 3.0 7              | $\approx 194$        | $E\alpha$ : from <a href="#">2006An11</a> . other: 7367 30 ( <a href="#">1999Ba45</a> ). Reduced $\alpha$ width $\delta_\alpha^2=0.17$ keV 4 ( <a href="#">2006An11</a> ).                                                                                                                    |
| 7612 <sup>#</sup> 5      | 0.0      | 9.0 5              | $\approx 435$        | $E\alpha$ : from <a href="#">2006An11</a> . other: 7612 15 ( <a href="#">1999Ba45</a> ). The adopted $E\alpha$ implies $Q(\alpha)=7778$ 5 for $^{187}\text{Bi}$ cf. 7779 4 from <a href="#">2012Wa38</a> . Reduced $\alpha$ width $\delta_\alpha^2=69$ keV 4.                                 |

<sup>†</sup> Intensity per 100 parent  $\alpha$  decays from  $I(7612\alpha):I(7342\alpha):I(7000\alpha)=9.0$  5:3.0 7:88 4 ([2006An11](#)). Other: 8.0:3.7:88.3 ([1999Ba45](#)).

<sup>‡</sup> If  $r_0=1.493$  7, unweighted average of ( $r_0(^{182}\text{Hg})=1.50$  2 ([1998Ak04](#)) and  $r_0(^{184}\text{Pb})=1.486$  10 (if  $E\alpha=7911$  13 and  $\% \alpha=100$  for  $^{188}\text{Po}$ ).

<sup>#</sup> This  $\alpha$  is correlated with 5910 $\alpha$  from  $^{183}\text{Hg}$   $\alpha$  decay ([1999Ba45](#)) which occurs following  $^{183}\text{Tl}$   $\varepsilon$  decay to  $^{183}\text{Hg}$ .

@ For absolute intensity per 100 decays, multiply by  $\approx 1.0$ .

& Existence of this branch is questionable.

<sup>187</sup>Bi α decay (38 ms)    2006An11,1999Ba45,1984ScZQ (continued)

| <u>γ(<sup>183</sup>Tl)</u>        |                             |                                  |                      |                                  |              |                       |                                                                                                                                                           |
|-----------------------------------|-----------------------------|----------------------------------|----------------------|----------------------------------|--------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>E<sub>γ</sub></u> <sup>‡</sup> | <u>E<sub>i</sub>(level)</u> | <u>J<sub>i</sub><sup>π</sup></u> | <u>E<sub>f</sub></u> | <u>J<sub>f</sub><sup>π</sup></u> | <u>Mult.</u> | <u>α</u> <sup>†</sup> | Comments                                                                                                                                                  |
| 273 1                             | 273?                        | (3/2 <sup>+</sup> )              | 0.0                  | (1/2 <sup>+</sup> )              | (M1)         | 0.508 9               | α(K)=0.416 8; α(L)=0.0703 13; α(M)=0.0164 3<br>α(N)=0.00415 8; α(O)=0.000805 14; α(P)=7.62×10 <sup>-5</sup> 14<br>Mult.: from α(K)exp=0.55 15 (2006An11). |

† Additional information 2.  
‡ From 2006An11.

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Decay Scheme

