

**$^{174}\text{Re}$   $\varepsilon$  decay    [1977Ha24,1977Be72,1975St02](#)**

| Type            | Author               | History | Citation          | Literature Cutoff Date |
|-----------------|----------------------|---------|-------------------|------------------------|
| Full Evaluation | E. Browne, Huo Junde |         | NDS 87, 15 (1999) | 1-Nov-1998             |

Parent:  $^{174}\text{Re}$ : E=0.0;  $T_{1/2}$ =2.40 min 4;  $Q(\varepsilon)$ = $6.5 \times 10^3$  SY; % $\varepsilon$ +% $\beta^+$  decay=100.0

[Additional information 1.](#)

 $^{174}\text{W}$  Levels

Levels above 889 keV are considered uncertain and have not been included in Adopted Levels.

| E(level)             | $J^\pi$        | E(level)             | $J^\pi$        | E(level) | E(level)  |
|----------------------|----------------|----------------------|----------------|----------|-----------|
| 0.0 <sup>‡</sup>     | 0 <sup>+</sup> | 704.9 <sup>‡</sup> 5 | 6 <sup>+</sup> | 1095.0 5 | 1219.2 7  |
| 112.4 <sup>‡</sup> 3 | 2 <sup>+</sup> | 889.6 4              |                | 1115.3 4 | 1255.8 11 |
| 355.8 <sup>‡</sup> 4 | 4 <sup>+</sup> | 1015.4 11            |                | 1200.6 6 |           |

<sup>†</sup> Adopted values.

<sup>‡</sup> Band(A):  $K^\pi=0^+$  g.s. rotational band.

 $\gamma(^{174}\text{W})$ 

$I_\gamma$  normalization: Experimental value deduced from  $^{174}\text{Re}$ - $^{174}\text{W}$  growth and decay curves ([1985Sz03](#)).

$^{174}\text{W}$  activity produced by  $^{165}\text{Ho}(^{16}\text{O},7n)$ , E=137.5, 151.2 MeV. Measured  $E_\gamma$ , absolute  $I_\gamma$  (using genetic relationships between members of the decay chain). Detector:Ge(Li) ([1985Sz03](#)).

Activity produced by  $^{181}\text{Ta}(a,^{11}\text{N})$ , E=133 MeV. Measured  $E_\gamma$  and  $I_\gamma$ . Detector:Ge(Li) ([1977Ha24](#)).

Activity produced by  $^{159}\text{Tb}(^{20}\text{Ne},5n)$ , E=180 MeV. Measured  $E_\gamma$  and  $I_\gamma$ . Detector:Ge(Li) ([1975St02](#)).

Measured  $E_\gamma$  and  $I_\gamma$ ,  $\gamma\gamma$  coin. Detectors:Ge(Li) ([1977Be72](#)). Other: [1972Be89](#).

$\varepsilon$  populations to excited levels were not deduced because the high  $Q(\beta^-)$  value (6540 syst) for  $^{174}\text{Re}$  suggests that many  $\gamma$ -ray transitions may be missing.

| $E_\gamma$ @         | $I_\gamma$ #&      | $E_i(\text{level})$ | $J_i^\pi$      | $E_f$ | $J_f^\pi$      | Mult. | $\alpha^a$ | Comments                                                                                                                                                                                                                            |
|----------------------|--------------------|---------------------|----------------|-------|----------------|-------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 112.4 3              | 26.5 15            | 112.4               | 2 <sup>+</sup> | 0.0   | 0 <sup>+</sup> | [E2]  | 2.53       | $E_\gamma$ : weighted average of 111.9 4 ( <a href="#">1975St02</a> ), 112.1 2 ( <a href="#">1977Ha24</a> ), and 112.9 2 ( <a href="#">1977Be72</a> ).                                                                              |
| 243.7 4              | 48.8               | 355.8               | 4 <sup>+</sup> | 112.4 | 2 <sup>+</sup> | [E2]  | 0.162      | $I_\gamma$ =19.8% 12 (absolute measurement of <a href="#">1985Sz03</a> ).<br>$E_\gamma$ : weighted average of 243.0 4 ( <a href="#">1975St02</a> ), 244.2 1 ( <a href="#">1977Ha24</a> ), and 243.2 1 ( <a href="#">1977Be72</a> ). |
| 349.1 3              | 6.4 7              | 704.9               | 6 <sup>+</sup> | 355.8 | 4 <sup>+</sup> | [E2]  | 0.0551     | $I_\gamma$ =37.4% 21 (absolute measurement of <a href="#">1985Sz03</a> ).<br>$E_\gamma$ : weighted average of 349.0 4 ( <a href="#">1975St02</a> ) and 349.3 5 ( <a href="#">1977Be72</a> ).                                        |
| 533.8 <sup>†</sup> 5 | 1.7 <sup>‡</sup> 3 | 889.6               |                | 355.8 | 4 <sup>+</sup> |       |            | $I_\gamma$ =4.7% 3 (absolute measurement of <a href="#">1985Sz03</a> ).                                                                                                                                                             |
| 739.3 <sup>†</sup> 2 | 6.2 <sup>‡</sup> 7 | 1095.0              |                | 355.8 | 4 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |
| 759.8 <sup>†</sup> 5 | 2.0 <sup>‡</sup> 3 | 1115.3              |                | 355.8 | 4 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |
| 777.2 <sup>†</sup> 2 | 3.5 <sup>‡</sup> 5 | 889.6               |                | 112.4 | 2 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |
| 863.4 <sup>†</sup> 5 | 2.4 <sup>‡</sup> 3 | 1219.2              |                | 355.8 | 4 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |
| 900 <sup>†</sup> 1   | 4 <sup>‡</sup> 2   | 1255.8              |                | 355.8 | 4 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |
| 903 <sup>†</sup> 1   | 5 <sup>‡</sup> 2   | 1015.4              |                | 112.4 | 2 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |
| 981.8 <sup>†</sup> 9 | 1.7 <sup>‡</sup> 3 | 1095.0              |                | 112.4 | 2 <sup>+</sup> |       |            |                                                                                                                                                                                                                                     |

Continued on next page (footnotes at end of table)

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 $^{174}\text{Re}$   $\varepsilon$  decay    [1977Ha24](#),[1977Be72](#),[1975St02](#) (continued)

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 $\gamma(^{174}\text{W})$  (continued)

| <u><math>E_\gamma</math> <sup>@</sup></u> | <u><math>I_\gamma</math> <sup>#&amp;</sup></u> | <u><math>E_i(\text{level})</math></u> | <u><math>J_i^\pi</math></u> | <u><math>E_f</math></u> | <u><math>J_f^\pi</math></u> |
|-------------------------------------------|------------------------------------------------|---------------------------------------|-----------------------------|-------------------------|-----------------------------|
| 1002.9 <sup>†</sup> 2                     | 7.5 <sup>‡</sup> 1                             | 1115.3                                |                             | 112.4                   | 2 <sup>+</sup>              |
| 1088.2 <sup>†</sup> 5                     | 3.4 <sup>‡</sup> 5                             | 1200.6                                |                             | 112.4                   | 2 <sup>+</sup>              |

<sup>†</sup> Observed by [1977Be72](#) only.<sup>‡</sup> Add 9% in quadrature to uncertainty of absolute  $I_\gamma$ .<sup>#</sup> From [1977Be72](#) relative to 48.8 for 243.7 $\gamma$ , unless otherwise specified.<sup>@</sup> From [1977Be72](#), unless otherwise specified.<sup>&</sup> For absolute intensity per 100 decays, multiply by 0.749.<sup>a</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.

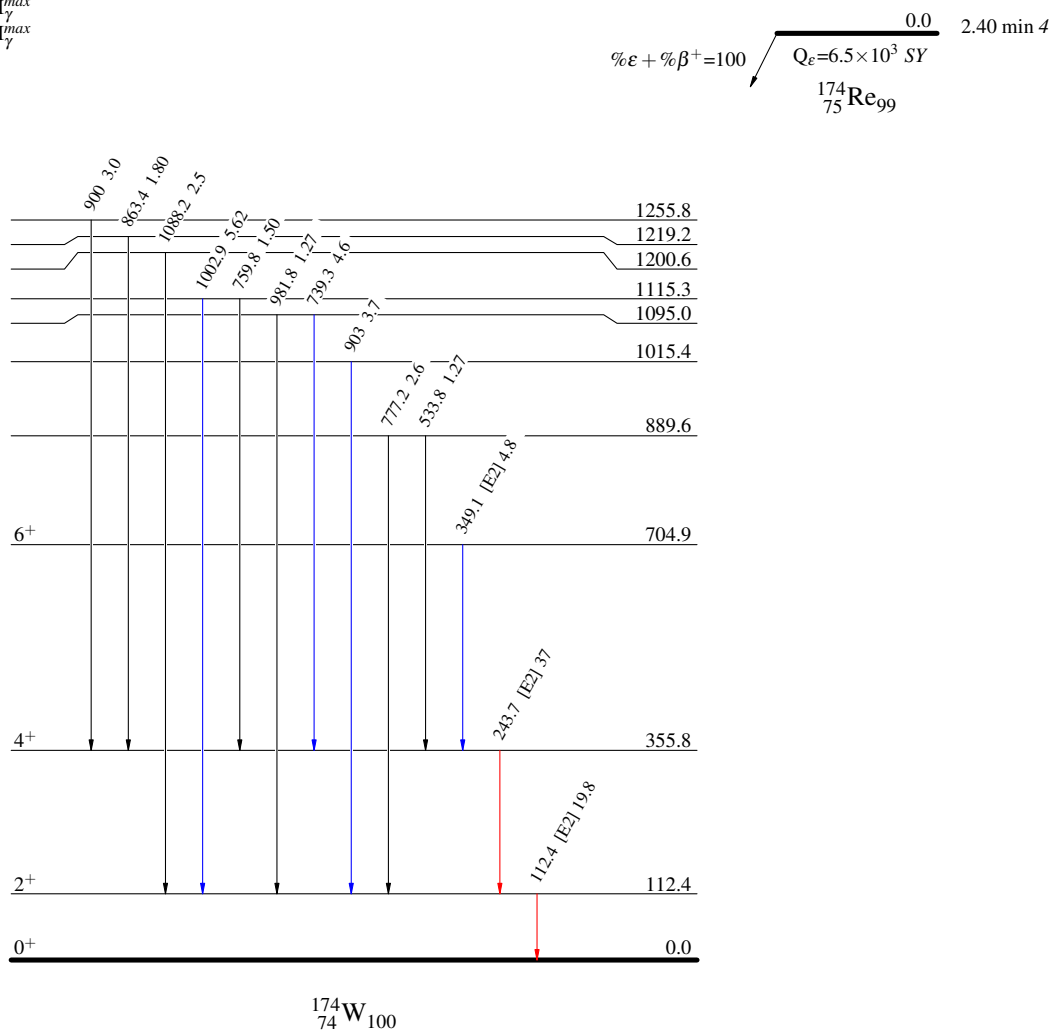
$^{174}\text{Re } \varepsilon \text{ decay } 1977\text{Ha24}, 1977\text{Be72}, 1975\text{St02}$ 

## Decay Scheme

Legend

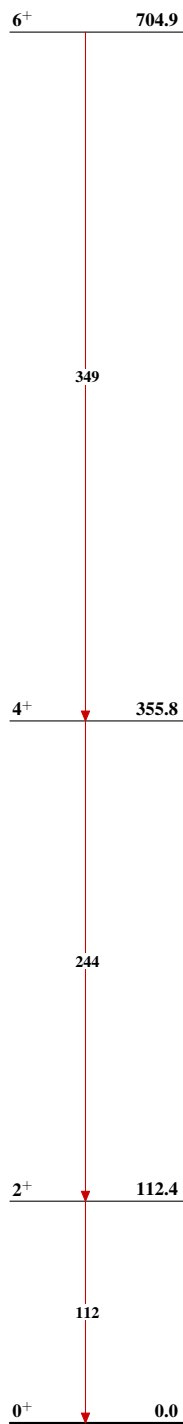
Intensities:  $I_\gamma$  per 100 parent decays

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



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**Band(A):  $K^\pi=0^+$  g.s.  
rotational band**



$^{174}_{74}\text{W}_{100}$