

Adopted Levels

| Type            | Author                       | History | Citation | Literature Cutoff Date |
|-----------------|------------------------------|---------|----------|------------------------|
| Full Evaluation | Balraj Singh, Sukhjeet Singh |         | ENSDF    | 08-Mar-2022            |

$Q(\beta^-)=-1880$  17;  $S(n)=6550$  80;  $S(p)=2812$  11;  $Q(\alpha)=7694$  4 [2021Wa16](#)

$S(2n)=14340$  90 (syst),  $S(2p)=7337$  9,  $Q(\varepsilon)=3867$  12 ([2021Wa16](#)).

[1958To25](#):  $^{224}\text{Pa}$  produced and identified in  $E=170$  MeV pulsed proton bombardment of Thorium, measured  $E\alpha$ . Later half-life and  $\alpha$  decay studies: [1970Bo13](#), [1996Li05](#), [1997Wi15](#), [2003Ni10](#).

Theoretical calculations: 18 references extracted from the NSR database are listed in document records.

[Additional information 1](#).

 $^{224}\text{Pa}$  LevelsCross Reference (XREF) Flags

**A**  $^{228}\text{Np}$   $\alpha$  decay (61.4 s)

| E(level) | $J^\pi$           | $T_{1/2}$  | XREF     | Comments  |
|----------|-------------------|------------|----------|---|
| 0        | (5 <sup>-</sup> ) | 0.846 s 20 | <b>A</b> | <p><math>\% \alpha=100</math></p> <p><math>J^\pi</math>: tentative assignment by <a href="#">1996Li05</a>, based on possible configuration=<br/> <math>\nu 5/2[633] \otimes \pi 5/2[523]</math>; <math>5/2[633]</math> from <math>g_{9/2}</math> neutron orbital, and <math>5/2[523]</math> from <math>h_{9/2}</math> proton orbital; single-particle assignments are based on theoretical calculations by <a href="#">1991Cw01</a> and <a href="#">1984Le04</a>.</p> <p><math>T_{1/2}</math>: from <math>\alpha</math>-decay curves; weighted average of 0.850 s 20 (<a href="#">1997Wi15</a>), 0.79 s 6 (<a href="#">1996Li05</a>), 0.95 s 15 (<a href="#">1970Bo13</a>). Other: 0.60 s 5 (<a href="#">1958To25</a>, estimated from measured <math>E\alpha</math> and Geiger-Nuttall law).</p> <p><math>\% \varepsilon + \% \beta^+</math>: <math>\approx 0.1</math> (from gross <math>\beta</math>-decay theory, <a href="#">1973Ta30</a>), <math>&lt; 9\%</math> (from <math>\beta</math> and <math>\alpha</math> decay theoretical half-lives in <a href="#">2019Mo01</a>).</p> <p>Measured <math>E\alpha</math> of the main <math>\alpha</math> transition=<math>7490</math> 10 (<a href="#">1970Bo13</a>); <math>7489</math> (<a href="#">1987FuZT</a>); <math>7488</math> (<a href="#">1996Li05</a>); <math>7522</math> (average of four values, <a href="#">2003Ni10</a>).</p> |