**Adopted Levels**

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh | NDS 156, 1 (2019) | 31-Jan-2019 |

$Q(\beta^-)=-3330$ *SY*; $S(n)=6780$ *SY*; $S(p)=1780$ *SY*; $Q(\alpha)=8816$ *12*   2017Wa10

Estimated uncertainties (2017Wa10): 410 for $Q(\beta^-)$, 360 for $S(n)$, 300 for $S(p)$.

$S(2n)=15010$ *380*, $S(2p)=5220$ *330*, $Q(\varepsilon p)=1410$ *300* (syst,2017Wa10).

2018It04 deduced mass excess($^{254}$Lr)=89713 keV *141* using $Q(\alpha)$ from 2017Wa10, where mass excess=89871 keV *301* from systematics.

1981Mu06: $^{254}$Lr identified as daughter of $^{258}$Db and grand-daughter of $^{262}$Bh, which were produced in $^{209}$Bi($^{54}$Cr,n), E=4.85 MeV/nucleon; and $^{209}$Bi($^{50}$Ti,n), E=4.75 MeV/nucleon reactions at GSI, measured half-life. Later measurements were made at the same laboratory and reported in 1985He22, 1989Mu09 and 2008An16.

1984Og03: $^{254}$Lr produced and identified in $^{208}$Pb($^{48}$Ti,pn) reaction, and assignment made through $\alpha$ decay chain, as grandparent of $^{246}$Cf through the 6750$\alpha$.

Theoretical studies: consult the NSR database at www.nndc.bnl.gov for 23 references dealing with theoretical calculations of half-lives for different decay modes, binding energies, fission characteristics, and other nuclear structure aspects.

Additional information 1.

$^{254}$Lr Levels

The deduced HF values for the observed $\alpha$ transitions are larger than 25, indicating that none of these $\alpha$ transitions are favored, therefore, the data indicate that the main configurations of these excited states are not identical to that of $^{258}$Db g.s.

Cross Reference (XREF) Flags

| | |
|---|---|
| A | $^{258}$Db $\alpha$ decay (4.3 s) |
| B | $^{258}$Db $\alpha$ decay (1.9 s) |

| E(level) | $T_{1/2}$ | XREF | Comments |
|---|---|---|---|
| 0 | 18.1 s *18* | A | %$\alpha$=71.7 *19*; %$\varepsilon$+%$\beta^+$=28.3 *19* (2008An16); %SF<0.1 (2000Ho27) |
| | | | %$\varepsilon$+%$\beta^+$ decay mode was determined from a total number of 158 $\alpha$ particles from the decay of $^{254}$No produced in $\varepsilon$ decay of $^{254}$Lr, and a total number of 445 $\alpha$ particles from the $\alpha$ decay of $^{254}$Lr. Others: %$\alpha$=76 *11*, %$\varepsilon$+%$\beta^+$=24 *11* (1985He22, same group as 2008An16, note that value of %$\varepsilon$+%$\beta^+$=22 *6* was modified to account for 90% $\alpha$ decay for $^{254}$No); %$\alpha$=60 *+11−15*, %$\varepsilon$+%$\beta^+$=40 *+15−11* (2006Fo02); %$\alpha$=94 (1984Og03). |
| | | | Upper limit for SF decay mode: see details in 2000Ho27 evaluation. |
| | | | $T_{1/2}$: from $\alpha$-decay curves. Weighted average of 18.4 s *18* (2008An16 at GSI) and 17.8 s *+19−16* (2008Ga25 at LBNL). Other less precise measurements with fewer number of correlated events: 22 s *+9−6* (2006Fo02, from the same group as 2008Ga25); 13.4 s *42* (2001Ga20 at HIRFL-Lanzhou); 10.0 s *+45−24* (1989Mu09); 13 s *+3−2* (1985He22, 1986He28); 10 s *+7−5* (1981Mu06). 1989Mu09, 1986He28, 1985He22 and 1981Mu06 are from GSI, the same research group as 2008An16. |
| | | | Decay modes from 2008An16. |
| 0+x? | | B | %$\alpha$=?; %$\varepsilon$+%$\beta^+$=? |
| | | | From the decays of two $\alpha$-activities in $^{258}$Db, 2009He20 assumed two long-lived activities in $^{254}$Lr, but two separate half-lives for $^{254}$Lr could not be determined. |
| 74 *50* | | A | |
| 190 *50* | | A | |
| 222 *50* | | A | |
| 248 *50* | | A | |
| 268 *50* | | A | |
| 344 *50* | | A | |