

$^{202}\text{Fr}$   $\alpha$  decay (0.286 s) [1992Hu04,2005Uu02,2014Ka23](#)

| Type            | Author                           | History | Citation            | Literature Cutoff Date |
|-----------------|----------------------------------|---------|---------------------|------------------------|
| Full Evaluation | Huang Xiaolong and Kang Mengxiao |         | NDS 133, 221 (2016) | 1-Dec-2015             |

Parent:  $^{202}\text{Fr}$ :  $E=102+x$ ;  $J^\pi=(10^-)$ ;  $T_{1/2}=0.286$  s 13;  $Q(\alpha)=7389$  4;  $\% \alpha$  decay  $\approx 100.0$

$^{202}\text{Fr}$ - $T_{1/2}$ : From [2014Ka23](#). Others: 0.29 s 5 ([2005Uu02](#)), 0.23 s +14-5 ([1996En01](#)), 0.34 s 4 ([1980Ew03](#)), 0.24 s +18-70 ([1998Es02](#)).

$^{202}\text{Fr}$ - $\% \alpha$  decay: From  $^{202}\text{Fr}$  Adopted Levels. 0.97 from systematics of  $\varepsilon$  decay ([1973Ta30](#)).

Decay of  $(10^-)$  isomer of  $^{202}\text{Fr}$ .

[2014Ka23](#):  $^{202}\text{Fr}$  produced in  $^{149}\text{Sm}(^{56}\text{Fe}, p2n)$  at  $E(^{56}\text{Fe})=244-275$  MeV beam from GSI accelerator facility. Target= $370$   $\mu\text{g}/\text{cm}^2$  thick enriched to 96.9% in  $^{149}\text{Sm}$ , and backed with  $40$   $\mu\text{g}/\text{cm}^2$  thick carbon backing and covered with a  $10$   $\mu\text{g}/\text{cm}^2$  layer of carbon. It was mounted on a rotating wheel. Evaporation residues were separated using SHIP facility at GSI, and implanted into the detection system consisting of 16-strip position sensitive Si detectors (PSSD), a pack of six Si strip detectors (BOX) at the back to detect escaping  $\alpha$  particles, and three time-of-flight detectors in front of PSSDs. Measured position and time correlations between evaporation residues (Er) and  $\alpha$  events,  $E\alpha$ , half-lives of ground states and isomers of  $^{202}\text{Fr}$  and  $^{198}\text{At}$ , Er- $\alpha$ - $\alpha$  correlations.

Comparison with previous experimental results.

(Er) $\alpha\alpha$  correlated events were assigned to  $^{202}\text{Fr} \rightarrow ^{198}\text{At} \rightarrow ^{194}\text{Bi}$  decay chain ([2014Ka23](#)).

 $^{198}\text{At}$  Levels

| E(level) | $J^\pi$  | $T_{1/2}$ | Comments                                                                                                                                                                                                              |
|----------|----------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 102+x    | $(10^-)$ | 1.21 s 6  | $\% \alpha=84$ 16<br>$T_{1/2}$ : From Adopted Levels.<br>E(level): From Adopted Levels.<br>$E\alpha=6849$ 5 from $\alpha$ decay of $^{198}\text{At}$ isomer to $^{194}\text{Bi}$ isomer ( <a href="#">2014Ka23</a> ). |

 $\alpha$  radiations

| $E\alpha$ | E(level) | $I\alpha^{\dagger\#}$ | $\text{HF}^{\ddagger}$ | Comments                                                                                                                                                                                                                                                                                                                                           |
|-----------|----------|-----------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7226 5    | 102+x    | 100                   | $\approx 1.8$          | $E\alpha$ : From <a href="#">2014Ka23</a> . Others: 7235 keV 8 ( <a href="#">2005Uu02</a> ), 7242 keV 6 ( <a href="#">1996En01</a> ), 7237 keV 8 ( <a href="#">1992Hu04</a> ), 7248 keV 13 ( <a href="#">1998Es02</a> ).<br>Reduced $\alpha$ width $\delta_\alpha^2=48$ keV 3 ( <a href="#">2014Ka23</a> ), 44 keV 8 ( <a href="#">2005Uu02</a> ). |

$^{\dagger}$  Per 100  $\alpha$  decays.

$^{\ddagger}$   $r_0=1.525$  15.

$^{\#}$  For absolute intensity per 100 decays, multiply by  $\approx 1.0$ .