

^{158}Ta α decay (36.0 ms) [2019Pa27,1997Da07](#)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 200,2 (2025)	22-Aug-2022

Parent: ^{158}Ta : E=141 9; $J^\pi=(9^+)$; $T_{1/2}=36.0$ ms 10; $Q(\alpha)=6124$ 4; $\% \alpha$ decay=95 5

^{158}Ta -E: from ^{158}Ta Adopted Levels (value from [1997Da07](#) based on E α and E ρ in ^{166}Ir decay chain).

^{158}Ta - J^π : from ^{158}Ta Adopted Levels ([1997Da07](#)).

^{158}Ta - $T_{1/2}$: weighted average of: 36.8 ms 16 ([1979Ho10](#)); 35 ms 1 ([1996Pa01](#)); and 37.7 ms 15 ([1997Da07](#)). Note T=36.7 ms 15 in ^{158}Ta adopted values (adopted by [2004He05](#) and maintained by [2017Ni05](#)).

^{158}Ta - $Q(\alpha)$: From [2021Wa16](#).

^{158}Ta - $\% \alpha$ decay: from ^{158}Ta Adopted Levels ([2017Ni05](#)).

[Additional information 2.](#)

[2019Pa27](#) compiled for XUNDL database by E.A. McCutchan (NNDC,BNL).

[2019Pa27](#): ^{58}Ni beam with E=318 MeV on a ^{106}Cd on self-supporting 0.975 mg/cm²-thick target. Separated recoils with RITU and implanted in DSSD. Measured E α , I α , recoil- α , α - γ using DSSD, 28 Si PIN diode detectors, a planar double sided Ge strip detector and three HPGe clover detectors.

[1997Da07](#), [1996Pa01](#), [1979Ho10](#): production from ^{162}Re α decay.

 ^{154}Lu Levels

E(level)	J^π [†]	$T_{1/2}$ [†]	Comments
0	(2 ⁻)		
≈59	(9 ⁺)	1.12 s 8	$\% \epsilon + \% \beta^+ \approx 100$ E(level): x=59 9 from ^{158}Ta α decays (1997Da07). Decay mode from ^{154}Lu Adopted Levels. Configuration $\pi h_{11/2} \nu f_{7/2}$. E(level): from 22.2 γ . Configuration $\pi h_{11/2} \nu f_{7/2}$. E(level): from 59.9 γ . J^π : from prompt 59.9 γ compatible with dipole transition and no parity change expected between low-energy $\pi h_{11/2}$ states in ^{154}Lu (2019Pa27).
81.2 5	(8 ⁺)		
118.9 5	(8 ⁺ , 9 ⁺ , 10 ⁺)		

[†] From Adopted Levels.

 α radiations

E α	E(level)	I α [‡]	HF [†]	Comments
5981 4	118.9	0.099 24	1.9×10^3 7	I α : determined from γ intensity and assuming M1 multipolarity for the 59.9 γ .
6021 4	81.2	2.7 5	96 30	I α : determined from γ intensity and assuming M1 multipolarity for the 22.2 γ .
6046 4	≈59	96 13	3.3 12	E α : Weighted average of 6046 4 (1996Pa01), 6051 6 (1979Ho10), 6048 5 (1997Da07), and 6041 4 (2019Pa27). I α : calculated using the total α branching ratio from 1996Pa01 .

[†] The nuclear radius parameter $r_0(^{154}\text{Lu})=1.5570$ 56 is deduced from interpolation of radius parameters of the adjacent even-even nuclides in [2020Si16](#).

[‡] For absolute intensity per 100 decays, multiply by 0.95 5.

¹⁵⁸Ta α decay (36.0 ms) 2019Pa27,1997Da07 (continued)

γ(¹⁵⁴Lu)

<u>E_γ</u>	<u>E_i(level)</u>	<u>J^π_i</u>	<u>E_f</u>	<u>J^π_f</u>	<u>Mult.</u>
22.2 5	81.2	(8 ⁺)	≈59	(9 ⁺)	[M1]
59.9 5	118.9	(8 ⁺ ,9 ⁺ ,10 ⁺)	≈59	(9 ⁺)	[M1]

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Decay Scheme

