^{258}Db α decay (4.3 s) 1985He22,2008Ga25,2009He20

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

Parent: ^{258}Db: E=0.0; $J^{\pi}=(5^+,6^+)$; $T_{1/2}$=4.3 s *5*; Q(α)=9500 *50*; %α decay=77 *8*

^{258}Db-J^{π},$T_{1/2}$: From ^{258}Db Adopted Levels in the ENSDF database (August 2017 update).

^{258}Db-Q(α): From 2017Wa10.

^{258}Db-%α decay: %α=77 *8* (from ^{258}Db Adopted Levels in the ENSDF database (August 2017 update)).

1985He22, 1999He11: four events at Eγ=22.5 *6* were observed by 1985He22 in coincidence with 9056 – 9129 α, attributed to 9078α (corresponding to 9089α adopted here). The 22.5-keV peak was assigned on the basis of its energy to Lβ_4 x ray, due to L1 conversion of a γ deexciting the level populated by 9078α. This γ transition was assumed to be M1, since for an E1 or E2 transition, the L2 conversion line would be stronger than the L1 conversion line. If this γ is a transition between the 344- and 248-keV levels, E$\gamma\approx$96 keV. No other x-rays or γ transitions were assigned to ^{258}Db α decay.

2001Ga20: measured α, $T_{1/2}$. Results are in general agreement with previous measurements.

2008Ga25: ^{258}Db isotope produced in ^{209}Bi(^{50}Ti,n) and ^{208}Pb(^{51}V,n) reactions using 4.7-5.1 MeV/nucleon beams of ^{51}V and ^{50}Ti provided by 88-Inch Cyclotron at LBNL. Detected α particles using silicon implantation detectors.

2009He20, 2016He15: ^{258}Db produced in ^{209}Bi(^{50}Ti,n),E=236 MeV, ^{50}Ti beam from the ECR source of the UNILAC at GSI. The Evaporation residues (ERs) were separated by the velocity filter SHIP and implanted into a position-sensitive 16-strip Si PIPS detector for detecting ERs, conversion electrons, and subsequent α-decays or spontaneous fission (SF) events. Escaped products into the backward hemisphere were detected by a box of six Si wafers. The x rays were detected by a Ge clover detector consisting of four crystals. Measured correlations between ERs, x rays, ce, α-decay, $\alpha\gamma$-coin and SF events. Deduced isomeric states and half-lives.

^{254}Lr Levels

E(level)[†]	$T_{1/2}$	Comments
0	18.1 s *18*	$T_{1/2}$: from Adopted Levels.
74 *50*		
190 *50*		
222 *50*		
248 *50*		
268 *50*		
344 *50*		

[†] Deduced from Q(α)(^{258}Db)=9500 *50* (2017Wa10) and the measured Eα values.

α radiations

Eα[†]	E(level)	Iα[‡&]	HF[#]	Comments
9014 *7*	344	5	≈117	Eα: other Eα=9009 *15* (1985He22).
9089[@] *10*	268	28	≈34	Eα: other: 9078 *15* (1985He22).
9109[@] *5*	248			
9134 *2*	222			In coin with 156.8γ (three events).
9166 *10*	190	<59	≥25	Eα: other: 9172 *15* (1985He22). The 9172α was resolved in two components, first in 1999He11, then in more detail in 2009He20, where 9166α was assigned to the decay of 4.3-s activity, and 9196α to the decay of 1.9-s activity of ^{258}Db. Iα: for 9166α+9196α.
9280 *20*	74	8	≈513	Eα: other: 9299 *15* (1985He22).
9353 *15*	0			

[†] From 2009He20 unless otherwise stated. Values are also available from 1985He22 and 1999He11. Also in 33 α decay chains starting from ^{262}Bh decay, following α lines are reported from ^{258}Db decay by 2006Fo02: 9211; 9178 (also

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α radiations (continued)

9170,9183,9183,9186,9186 in the same group); 9137 (also 9130,9124,9132 in the same group); 9101 (also 9107); 9084; 9058 (also 9056); and 9027. Most of these lines can correspond to those from 2009He20 and 1985He22.

‡ α intensity per 100 α decays, measured by 1985He22. Uncertainties were not given. Any effect due to energy summing with conversion electrons has not been included.

$r_0(^{254}Lr)\approx1.46$, deduced from r_0 values given in 1998Ak04, is used in calculations.

@ These two α groups were not resolved and one peak at 9078 *15* was measured in the earlier work by 1985He22.

& For absolute intensity per 100 decays, multiply by 0.77 *8*.

γ(^{254}Lr)

E_γ	E_i(level)	Comments
x156.8 *6*		γ from αγ-coin data (2009He20). This γ seen in coin with 9014α (two events), with 9050α (one event), with 9134α (three events) and with 9093α (one event). Energy uncertainty is from Table 3 in 2009He20, also listed by authors as 0.4 keV in section 3.5 of the paper.
x221.5 *4*		E_γ: from αγ-coin (2009He20). This γ seen in coin with 9009α (one event) and with 9109α (five events). Energy uncertainty is from Table 3 in 2009He20, also listed by authors as 0.1 keV in section 3.5 of the paper.

x γ ray not placed in level scheme.