Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 144, 297 (2017)	25-Aug-2017

Q(β^-)=−3450 *SY*; S(n)=6480 *SY*; S(p)=1360 *SY*; Q(α)=9500 *50* 2017Wa10
Estimated uncertainties (2017Wa10): 510 for Q(β^-), 370 for S(n), 310 for S(p).
S(2n)=14840 *390*, S(2p)=4530 *320*, Q(εp)=1840 *310* (syst,2017Wa10).
1984Og03: ^{258}Db produced and identified in ^{208}Bi(^{50}Ti,n) and parent of ^{258}Rf activity.
1985He22: ^{258}Db produced in ^{208}Bi(^{50}Ti,n), and identified as parent of ^{254}No, ^{254}Lr, ^{250}Fm, and ^{250}Md through $\alpha\alpha$ correlations, measured half-lives.
2001Ga20: ^{258}Db produced in ^{241}Am(^{22}Ne,5n), measured half-lives.
2008Ga25: ^{258}Db produced in ^{208}Pb(^{51}V,n),(^{50}Ti,n) reactions at E=4.7-5.1 MeV/nucleon, with beams of ^{51}V (11^+ charge state) and ^{50}Ti (12^+ charge state) provided by 88-Inch Cyclotron at LBNL. Separated and detected charged particles using BGS focal plane detector and a multiwire proportional counter. Measured Eα, Iα and half-life of ^{258}Db decay using silicon implantation detectors.
2016He15: ^{258}Db produced in ^{209}Bi(^{50}Ti,n),E=236 MeV, with ^{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 and SF events. Deduced isomeric states and half-lives.
Theoretical studies: consult the NSR database at www.nndc.bnl.gov for about 40 references dealing with theoretical calculations of half-lives for different decay modes, binding energies, fission characteristics, and other nuclear structure aspects.
Additional information 1.

^{258}Db Levels

Cross Reference (XREF) Flags

A ^{262}Bh α decay (83 ms)
B ^{262}Bh α decay (16 ms)

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	(5^+,6^+)	4.3 s *5*	A	%α=77 *8*; %ε+%β^+=23 *8* (2009He20) ε decay to excited states including two newly-proposed isomeric states in ^{258}Rf (2016He15). $T_{1/2}$: from 2009He20. In their later work, 2016He15 report 4.4 s *10* and 3.6 s *3* activities from the time distributions of SF events, correlated and uncorrelated with conversion electron events, respectively, which could support the existence of two long-lived states in ^{258}Db as claimed in their α-decay study in 2009He20, but is not a sufficient argument for an unambiguous claim by itself in the work of 2016He15. Others: 4.2 s *+4−3* (2008Ga25, from 77 correlated α decays); 4.2 s *+16−5* (1984Og03, SF decay of ^{258}Rf, daughter of ^{258}Db was detected); 4.4 s *+9−6* (1985He22; α from ^{262}Bh decay); 3.0 s *+8−6* (1989Mu09, α from ^{262}Bh decay); 4.3 s *11* (2001Ga20, from α of ^{258}Db decay); 1.8 s *+11−7* and 4.0 s *+10−8* (1981Mu06, α decays from ^{262}Bh and ^{258}Db); 6.1 s *+10−8* (1985He22, from SF activities). J^π: from shell-model calculations (2016He15). Possible configurations: ν11/2[725] + π1/2[521] for 6^+ or ν9/2[624] + π1/2[620] for 5^+. Additional information 2.
0+x	(1^-)	1.9 s *5*		%α=64 *10*; %ε+%β^+=36 *10* (2009He20) ε decay to g.s. and probable low-lying states in ^{258}Rf (2016He15). $T_{1/2}$: from 2016He15, taken from authors′ earlier work in 2009He20. 2016He15 report 4.4 s *10* and 3.6 s *3* from the time distributions of SF events, correlated and uncorrelated with conversion electrons, respectively, which could support the existence of two different long-lived states in ^{258}Db as claimed from their α-decay study in 2009He20,

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{258}Db Levels (continued)

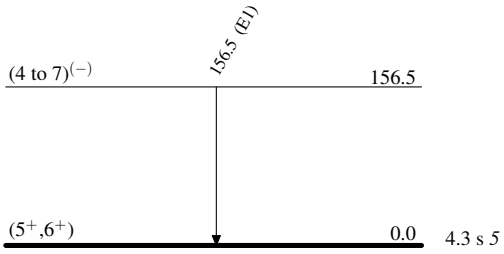
E(level)	J^π	$T_{1/2}$	XREF	Comments
				but not sufficient for an unambiguous claim by itself in 2016He15.
				J^π: from shell-model calculations (2016He15). Possible configuration: ν1/2[620] + π1/2[521] for 1^-.
0+y?		20 s *10*		%$\varepsilon\approx$100 Existence of this isomer has not been established. No α decays were observed from this activity (1985He22). $T_{1/2}$: deduced by 1985He22 based on difference in half-lives observed from α decay (4.4 s) and SF (6.1 s +*10*−*6*); the larger value was explained by 1985He22 by postulating a 20-s isomer in ^{258}Db which decays by ε to ^{258}Rf which in turn decays by SF with $T_{1/2}$=12 ms.
0+z			B	
156.5 *7*	(4 to 7)$^{(-)}$		A	J^π: (E1) γ to (5^+,6^+).
184+z *50*			B	
222 *20*			A	
358 *30*			A	A 38.9γ observed by 2009He20 in coin with 9810α groups.
480 *20*			A	A 38.9γ observed by 2009He20 in coin with 9671α groups.
561+z *50*			B	A 102.4 *5* γ observed by 2009He20 in coin with 9826α group.

$\gamma(^{258}$Db)

E_i(level)	J_i^π	E_γ	E_f	J_f^π	Mult.	Comments
156.5	(4 to 7)$^{(-)}$	156.5 *7*	0.0	(5^+,6^+)	(E1)	Mult.: possible E1, estimated from number of observed $\alpha\gamma$ coincidences.

Adopted Levels, Gammas

Level Scheme



$^{258}_{105}Db_{153}$