^{223}U α decay (59 μs) 2020Su02,1994Ye08,1991An10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh et al. ,	NDS 175,1 (2021)	19-May-2021

Parent: ^{223}U: E=0.0; J^π=(7/2$^+$); $T_{1/2}$=59 μs *10*; Q(α)=9158 *17*; %α decay=100

^{223}U-J^π: From systematics of g.s. J^π values of N=131 isotones, as proposed in 2020Su02.

^{223}U-$T_{1/2}$: From weighted average of 62 μs *+14−10* (2020Su02, deduced from 60 μs *+24−13* for 8753α, 28 μs *+23−9* for 8898 line and 78 μs *+39−20* for 8993α using maximum likelihood method); and 55 μs *10* (based on better statistics data collected in their earlier studies, 1997AnZY claimed that 55 μs *10* value was more reliable than the value of 18 μs *+10−5* reported in their other studies: 1991An10 and 1991An13). From the three half-lives reported in 2020Su02, evaluators obtain weighted averaged of 58 μs *+14−11*.

^{223}U-Q(α): From 2021Wa16.

^{223}U-%α decay: %α=100.

2020Su02: ^{223}U was produced in the fusion-evaporation reaction ^{187}Re(^{40}Ar,p3n) at E(^{40}Ar)=188 MeV, followed by separation of fragments using SHANS in-flight separator, and implanted into a double-sided silicon strip detector (DSSD) at Lanzhou accelerator facility. Measured Eα and Iα for two α transitions, half-life of ^{223}U decay. Deduced hindrance factors.

1997AnZY, 1994Ye08, 1991An10, 1991An13: ^{223}U activity was produced in ^{208}Pb(^{22}Ne,7n),E=100-155 MeV (1997AnZY); ^{197}Au(^{27}Al,n) (1994Ye08); ^{208}Pb(^{20}Ne,5n) (1991An10,1991An13), and separated using the electrostatic recoil separator VASSILISSA at JINR-Dubna. Measured Eα, Iα, $T_{1/2}$ using Si detectors.

Additional information 1.

The decay scheme is from 2020Su02.

^{219}Th Levels

E(level)	J^π[†]	$T_{1/2}$[†]	Comments
0.0	(9/2$^+$)	1.025 μs *30*	
97? *25*			This level is not included in the Adopted Levels.
244 *23*	(7/2$^+$)		2020Su02 suggested J^π=(7/2$^+$,11/2$^+$), based on systematics of low-lying levels in N=129 isotones. Evaluators prefer (7/2$^+$) as, in the Adopted dataset, (11/2$^+$) is assigned to the 362.5 level. Also, (7/2$^+$) is suggested by favored α decay from (7/2$^+$) parent.

[†] From the Adopted Levels.

α radiations

Eα	E(level)	Iα[‡]	HF[†]	Comments
8753 *16*	244	65 *13*	1.0 *3*	Eα,Iα: from 2020Su02. Uncertainty for Iα given as 20 by 2020Su02 has been revised to 13 (based on Iα(8993α)=35 *13* and expected Iα(8753)=100−Iα(8993α)). Value of Iα in 2020Su02 assumed that the 8898-keV peak observed in the ER-α correlated spectrum was entirely due to sum peak (8753α and conversion electrons). Other: Eα=8780 *40*, Iα=100 (1994Ye08). Reduced α-decay width δ^2=198 keV *61*, HF=1.6 *5* (2020Su02).
8898[#] *18*	97?			Eα: A line at 8898 keV seen by 2020Su02 in their α spectrum, with an apparent intensity of 19% *9* is most likely due to sum of 8753α and conversion electrons, as discussed by the authors.
8993 *17*	0.0	35 *13*	8 *4*	Eα,Iα: From 2020Su02. Reduced α-decay width δ^2=25 keV *9*, HF=12 *5* (2020Su02).

[†] The nuclear radius parameter r_0(^{219}Th)=1.5402 *90* is deduced from interpolation (or unweighted average) of radius parameters of the adjacent even-even nuclides given in 2020Si16.

[‡] Absolute intensity per 100 decays.

[#] Existence of this branch is questionable.