^{155}Lu α decay (2.69 ms) 1981HoZM,1993Li34,1996Pa01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110, 1 (2009)	20-Nov-2008

Parent: ^{155}Lu: E=1781 *2*; J^π=(25/2$^-$); $T_{1/2}$=2.69 ms *3*; Q(α)=5802.7 *26*; %α decay=100.0

^{155}Lu-Energy, J^π, $T_{1/2}$ and related comments are taken from A=155 evaluation (2005Re01).

^{155}Lu-E: calculated from the difference of the energies of the α transitions from this level and from the ^{155}Lu g.s. (J^π=11/2$^-$). Proposed configuration=$(\pi h_{11/2})^3(\nu h_{9/2})(\nu F_{7/2})$, with one of the $h_{11/2}$ protons coupled with the $h_{9/2}$ neutron to J^π=1$^+$.

^{155}Lu-J^π: from the systematics of the level structure of the near-lying odd-mass N=84 nuclides (see 2001Di17 and references therein).

^{155}Lu-$T_{1/2}$: weighted average of 2.71 ms *3* (1996Pa01) and 2.60 ms *7* (1989Ho12). Other: 2.7 ms *3* (1979Ho10).

^{155}Lu-%α decay: from the presently established level scheme of ^{155}Lu, γ emission can take place only via E4 and/or M3 transitions; thus the α emission is the faster mode of decay than the γ emission mode (see 1989Ho12).

1981HoZM: produced by bombarding a number of proton rich elements in the region of Zr-Sn, Fe-Mo and V-Ni with ^{58}Ni, ^{92}Mo and ^{107}Ag beams. Isotopic identification: on the basis of cross-bombardment and lack of correlation with any daughter α lines in the position-time correlation technique.

1993Li34: source produced in ^{102}Pd(^{58}Ni,X) reaction and recoil-separator used to study the fragments.

The energy of the parent state is deduced from the 7379 α group and 5648 α group, assuming that the 7379 α group proceeds to the 11/2$^-$ g.s. The energy of this state would be higher by≈50 keV if the α decay proceeds to the $s_{1/2}$ state in ^{151}Tm.

1996Pa01: measured Eα, $T_{1/2}$.

1996Bu35: calculated $T_{1/2}$.

J^π=25/2$^-$ for the α decaying state is from 1989Ho12.

The absence of α decay to other high-spin states involving lesser L-transfer (than L=6 or 12 involved in decay to g.s. or $s_{1/2}$ state) is not explained.

Eα=7408 *10* (1981HoZM), 7379 *15* (1993Li34), 7390 *5* (1996Pa01).

$T_{1/2}$=2.60 ms *7* (1981HoZM), 2.71 ms *3* (1996Pa01).

^{151}Tm Levels

E(level)	J^π	Comments
0.0?	(11/2$^-$)	J^π: from 'Adopted Levels'.

α radiations

Eα[†]	E(level)	Comments
7390 *5*	0.0?	Eα: from 1996Pa01. Others: 7379 *15* (1993Li34), 7408 *10* (1981HoZM). This α group could also populate the $s_{1/2}$ state at 0+x where x≈50.

[†] Assuming α branching ratio 100% and s-wave transition, the reduced Γ_α shows a large (≈1×10^5) hindrance. If one assumes an angular momentum change of 10±2, one obtains a reduced Γ_α of the order of 1, thereby suggesting that the parent state is a high-spin isomer.