^{175}Yb β^- decay   **1994Mi04,1971Gr41,1970Br38**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 102, 719 (2004)	1-Jun-2004

Parent: ^{175}Yb: E=0.0; J^π=7/2$^-$; $T_{1/2}$=4.185 d 1; Q(β^-)=470.1 13; %β^- decay=100.0
Includes: 1970Re08, 1966Em03.

^{175}Lu Levels

E(level)[†]	J^π	$T_{1/2}$	Comments
0.0[‡]	7/2$^+$	stable	
113.806[‡] 4	9/2$^+$	99 ps 9	$T_{1/2}$: from 1965Ro17. Other values: 101 ps 7 (1960Bl10); 106 ps 11 (1965Ay04).
251.465[‡] 7	11/2$^+$		
396.328[#] 7	9/2$^-$	3.31 ns 10	$T_{1/2}$: from 1966Mc08. Other values: 3.25 ns 10 (1962Be46); 3.29 ns 16 (1965Ay01).

[†] Deduced by evaluator from a least-squares fit to γ-ray energies.
[‡] 7/2(404) band.
[#] 9/2(514) band.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log ft	Comments
(73.8 13)	396.328	20.4 4	4.44 3	av Eβ=19.0 4 Iβ^-: Iβ=10.1% 4 (1962Ba32) does not agree with value from γ-ray transition intensity balance.
(218.6 13)	251.465	<0.016	>8.6[1u]	av Eβ=68.9 5
(356.3 13)	113.806	6.7 4	7.07 3	av Eβ=102.4 5 Iβ^-: Iβ=2.63% 21 (1962Ba32).
(470.1 13)	0.0	72.9 5	6.426 5	av Eβ=139.9 5

[†] From γ-ray transition intensity balance.
[‡] Absolute intensity per 100 decays.

$\gamma(^{175}$Lu)

Iγ normalization: from Iγ(396 γ)=13.15% 16, experimental value in 1994Mi04.

Eγ[†]	Iγ[‡#]	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.	δ	α[@]	Comments
113.805 4	29.4 2	113.806	9/2$^+$	0.0	7/2$^+$	M1+E2	+0.464 5	2.51	α(K)=1.92 1; α(L)=0.455 2; α(M)=0.106 1; α(N+..)=0.0300 2 Mult.: from α(K)exp=1.98 5 (weighted average of 2.07 6 (1966As02), 1.94 20 (1969Ni01), 1.80 18 & 1.90 8 (1970Re08), and 1.82 15 (1974Co18)) and K:L1:L2:L3 exp=674 4:100.0 3:41.5 8:31.0 4 (1969Ni01). δ: Weighted average of +0.465 5 (1975Qu02) and 0.45 2 (1981Sk01). δ=0.468 20 deduced by evaluator from least-squares fit of α(K)exp and K:L1:L2:L3 exp.

Continued on next page (footnotes at end of table)

^{175}Yb β^- decay   1994Mi04,1971Gr41,1970Br38 (continued)

$\gamma(^{175}$Lu) (continued)

E_γ[†]	I_γ[‡#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[@]	Comments
137.658 6	1.79 12	251.465	11/2$^+$	113.806	9/2$^+$	M1+E2	+0.48 3	1.42 1	α(K)=1.11 1; α(L)=0.238 3; α(M)=0.0552 7; α(N+..)=0.0150 2 Mult.: from α(K)exp=1.19 8 (1966As02), K/L exp=4.3 5 (1960Be16). δ: weighted average 0.51 2 (1976Kr21) and 0.45 2 (1981Sk01).
144.863 5	5.11 5	396.328	9/2$^-$	251.465	11/2$^+$	E1(+M2)	−0.014 23	0.134 11	α(K)=0.111 8; α(L)=0.0179 20; α(M)=0.0040 5; α(N+..)=0.00105 14 Mult.: from α(K)exp=0.096 8, (weighted average of 0.084 6 (1966Ha04), 0.101 15 & 0.106 16 (1970Re08) and 0.114 8 (1971Gr41)) and K:L1:L2 exp=114 8: 122 11:28 6 (1971Gr41). Weak experimental evidence of nuclear penetration effects (1966Ha04,1971Gr41). δ: from 1972Kr18.
251.474 17	1.31 19	251.465	11/2$^+$	0.0	7/2$^+$	E2		0.133	α(K)=0.088; α(L)=0.0343; α(M)=0.00825; α(N+..)=0.00240 Mult.: from α(K)exp=0.088 deduced by evaluator from data in 1971Gr41.
282.522 14	46.6 3	396.328	9/2$^-$	113.806	9/2$^+$	E1(+M2)	0.06 6	0.027 9	α(K)=0.023 7; α(L)=0.0035 15; α(M)=0.0008 4; α(N+..)=0.00024 10 Mult.: from α(K)exp=0.023 1 (weighted average of 0.022 1 (1966Ha04), 0.0248 24, 0.0262 18 (1970Re08), 0.0212 12 (1971Gr41)) and K:L1:L2:L3 exp=100 2:15.0 4:3.60 24:1.66 17 (1971Gr41). Possible nuclear penetration effects. (λ_1=−8.35 λ_2=170, see 1969Ha61,1976Mi07). δ: from 1972Kr18.
396.329 20	100.0 15	396.328	9/2$^-$	0.0	7/2$^+$	E1+M2	+0.105 8	0.047 2	Mult.: α(K)exp=0.0380 20 (weighted average of 0.037 2 (1966Ha04), 0.0422 30, 0.0445 32 (1970Re08), 0.0349 21 (1971Gr41)) and K:L1:L2:L3 exp=100:15.4 3:1.81 5:0.33 4 (1971Gr41). Nuclear penetration effects λ_1=12.5 λ_2=53 (1969Ha61,

$\gamma(^{175}$Lu) (continued)

E$_\gamma$[†]	E$_i$(level)	Comments
		δ: from 1972Kr18.

[†] From 1970Br38, but adjusted by evaluator to the new calibration standards of 1980De40.

[‡] Weighted average of Iγ from 1994Mi04, 1970Br38, 1970Re08, and 1966Em03 (limitation of relative statistical weight method for 1.79 *12*, Iγ of 137.658γ).

[#] For absolute intensity per 100 decays, multiply by 0.1315 *16*.

[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^{175}Yb β^- decay   1994Mi04,1971Gr41,1970Br38

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

$7/2^-$ 0.0   4.185 d 1

$Q_{\beta^-}=470.1$ 13 %β^-=100

$^{175}_{70}Yb_{105}$

$I\beta^-$	Log ft			
20.4	4.44	$9/2^-$	396.328	3.31 ns 10
<0.016	>8.6^{1u}	$11/2^+$	251.465	
6.7	7.07	$9/2^+$	113.806	99 ps 9
72.9	6.426	$7/2^+$	0.0	stable

396.329 E1+M2 13.8
282.522 E1(+M2) 6.29
144.863 E1(+M2) 0.762
251.474 E2 0.20
137.658 M1+E2 0.57
113.805 M1+E2 13.57

$^{175}_{71}Lu_{104}$