^{174}Lu IT decay (142 d) 1987Va34

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, Huo Junde	NDS 87, 15 (1999)	1-Nov-1998

Parent: ^{174}Lu: E=170.83 *5*; $J^{\pi}=(6^-)$; $T_{1/2}$=142 d *2*; %IT decay=99.38 *2*

Additional information 1.

Others: 1959Di44, 1962Dz07, 1965Fu01, 1965Ri05, 1967Gi06, 1969Ka19, 1975Ki06.

^{174}Lu (142 d) produced with ^{40}Ar (E=304 MeV), ^{84}Kr (E=714 MeV), and ^{136}Xe (E=1156 MeV) on tungsten targets (1987Va34). No additional ^{174}Lu isomers with $T_{1/2}$>2 min were observed (1983Zy02).

Measured γ rays (1975Ki06); conversion electrons (1969Ka19,1967Gi06).

^{174}Lu Levels

E(level)[@]	J^{π}[#]	$T_{1/2}$	Comments
0.0[†]	(1^-)	3.31 y *5*	$T_{1/2}$: from Adopted Levels, gammas.
44.686[†] *7*	(2^-)		
111.747[†] *9*	(3^-)		
170.83[‡] *5*	(6^-)	142 d *2*	$T_{1/2}$: from Adopted Levels, gammas.

[†] $K^{\pi}=(1^-)$ g.s.-rotational band member. Possible Configuration=(π 7/2[404])-(ν 5/2[512]). Experimental μ=1.94 *28* $\gamma(\theta$,H,t) compares with μ=+1.85 (theory) for this configuration (1975Kr11).

[‡] $K^{\pi}=(6^-)$ rotational band member. Possible Configuration=(π 7/2[404])+(ν 5/2[512]). Experimental μ=1.497 *10* compares with μ=+1.76 (theory) for this configuration (1975Kr11).

[#] From Adopted Levels.

[@] Deduced by evaluator from a least-squares fit to γ-ray energies of 1987Va34.

$\gamma(^{174}Lu)$

Iγ normalization: From decay scheme if no ε feeding to ^{174}Yb g.s. from ^{174}Lu(142 d), and Ti(273γ, ε decay)+Ti(1264γ, ε decay)+Ti(44γ) + Ti(112γ)=100%.

Measured x-ray intensities are: Kα_2 x ray=3840 *90*, Kα_1 x ray=6578 *134*, Kβ_1 x ray=2153 *117*, Kβ_2 x ray=574 *18* (1987Va34).

E_γ	I_γ[†‡]	E_i(level)	J_i^{π}	E_f	J_f^{π}	Mult.	δ	α[#]	Comments
44.683 *3*	2291 *50*	44.686	(2^-)	0.0	(1^-)	M1+E2	≈0.05	6.9 *3*	α(L)= 5.33 *19*; α(M)= 1.20 *5* E_γ: other values: 44.7 (1967Gi06), 44.65 (1960Ha18), 44.681 *20* (1975Ki06), 44.73 *2* (1969Ka19). I_γ: other value: 2037 *44* (1975Ki06). Mult.,δ: from ce(L1)+ce(L2)/ce(L3) exp=37.7 *40*, ce(L1)/ce(L3) exp=28 *2* (1969Ka19). Other data reported: ce(L3)/ce(L) exp=0.028 *3*, ce(L):ce(M):ce(N)+ce(O) exp=2410 *50*:558 *11*:128 *2* (1967Gi06). Other values: ce(L1):ce(L2):ce(L3) exp=580 *10*:100:52 *2*, ce(M1):ce(M2):ce(M3): ce(M4)+ce(M5) exp=1000 *100*:100:40 *10*:50 *10* (1969Ka19); ce(L1):ce(L2):ce(L3):ce(M): ce(N) exp=1290:160:ap65:350:115 (1960Ha18).
59.08 *2*	5.3 *2*	170.83	(6^-)	111.747	(3^-)	M3		3321	α(L)= 2427; α(M)= 688;

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^{174}Lu IT decay (142 d) 1987Va34 (continued)

$\gamma(^{174}Lu)$ (continued)

E_γ	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[#]	Comments
									α(N+..)= 206 E_γ: from 1969Ka19, 1987Va34. Other values: 59.1 (1967Gi06); 59.05 (1960Ha18). I_γ: from intensity balance, Ti(59γ)=17545 *614*, and α (theory,M3)=3320. Mult.: from ce(L1):ce(L2):ce(L3) exp=720 *20*:100:1630 *30* (1969Ka19). Other data reported: ce(M1)/ce(M3) exp=0.7 *1* (1969Ka19). Other values: ce(L):ce(M):ce(N)+ce(O) exp=2570:717 *20*:195 *5* s (1967Gi06); ce(L1):ce(L2):ce(L3):ce(M):ce(N) exp=780:<180:1610:670:240 (1960Ha18).
67.058 *3*	1336 *27*	111.747	(3$^-$)	44.686	(2$^-$)	M1+E2	+0.09 *1*	12.0	α(K)= 9.88; α(L)= 1.64; α(M)= 0.370; α(N+..)= 0.106 E_γ: other values: 67.075 *25* (1975Ki06), 67.08 *2* (1969Ka19), 67.10 (1969Gu15), 67.1 (1967Gi06), 67.05 (1960Ha18). I_γ: other value: 1107 (1969Gu15). Other: 1975Ki06. δ: from ce(L1)/ce(L3) exp=20 *2* (1969Ka19). Sign from $\gamma(\theta$,H,t) (1975Kr11). Other data reported: ce(L1)/ce(L2) exp=3-10, ce(M1)/ce(M2) exp=2.7 *5* (1969Ka19). Other values: ce(K):ce(L):ce(M) exp=1230-2415:335 *10*:68 *3* (1967Gi06); ce(L1)/ce(L)+ce(M) exp=3.4 s (1960Ha18). δ>0 $\gamma(\theta$,H,t) (1975Kr11). Mult.: from α(K)exp=10.25 *58* (1974Vi05). Other value: 11.01 *44* (1975Ki06). This latter measurement was performed using a source produced by ^{175}Lu(n,2n). Although authors have corrected the measured K x ray intensity for x-ray fluorescence in the source, the correction may not have completely removed this contribution, causing an≈7% increase in the value of α(K)exp. α(K)exp=10.30 *26* (1987Va34).
111.762 *7*	55.0 *15*	111.747	(3$^-$)	0.0	(1$^-$)	E2		2.23	α(K)= 0.784; α(L)= 1.10; α(M)= 0.270; α(N+..)= 0.0750 E_γ: other values: 111.66 (1969Gu15), 111.7 *1* (1975Ki06), 111.8 (1967Gi06). I_γ: other values: 60 (1969Gu15), 51 *3* (1975Ki06), 59 *2* (1984Ke13). Mult.: from α(L)(exp)=1.5 *2*, calculated by evaluator assuming 67γ is M1+0.8% E2 using ce(L) from 1967Gi06 and Iγ from 1987Va34.
126.2	2.8 *20*	170.83	(6$^-$)	44.686	(2$^-$)	[E4]		266	α(K)= 5.48; α(L)= 191; α(M)=

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^{174}Lu IT decay (142 d) 1987Va34 (continued)

$\gamma(^{174}Lu)$ (continued)

E_γ	E_i(level)	Comments
		54.2; α(N+..)= 15.6 E_γ: from 1967Gi06, 1987Va34. I_γ: from intensity balance, Ti(126γ)=754 *529*, α(theory, E4)=266.

† Intensities are relative to 100 for 992γ with ε.
‡ For absolute intensity per 100 decays, multiply by 0.00543 *12*.
# 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.