Adopted Levels, Gammas

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

Q(β^-)=−11434 (syst) *425*; S(n)=10975 (syst) *425*; S(p)=2340 (syst) *359*; Q(α)=2.6×10^3 *3* 2017Wa10
Q(ε)=9.2×10^3 *3*; S(2n)=24487 (syst) *425*; S(2p)=2.4×10$^{3(syst)}$ *359*; Q(εp)=9.0×10^3 *3* 2017Wa10
Additional information 1.
1986To12: this nucleus was identified via its β-delayed proton decay. It was produced in ^{96}Ru(^{58}Ni,n2p) reaction at E=360 MeV. The isotopic identification was made on the basis that the measured lifetime is new to the isobaric chain and the protons are in coincidence with Tm x-rays and known ^{150}Er γ rays. Further evidence for isotopic identification is provided (1995Ni10) by the mass gated ce studies using fragment mass analyzer.
The delayed proton spectrum extends from≈2.5 MeV to≈7 MeV and shows a 1.6 s *1* half-life.
No α decay from ^{155}Hf, $T_{1/2}$=0.89 s *12* (to ^{151}Yb) has been reported (1981HoZM). For Q(α)=5245 to 3895, systematics of α decay give %α from 1 to 1.0×10^{-8} (see Nuclear Data Sheets for α=155, 2005Re01).
The ordering of the 226-172-202 cascade is not established. The placement of these γ rays is based on matching of 600γ with sum of 226, 172 and 202 γ rays.

^{151}Yb Levels

Cross Reference (XREF) Flags

A ^{151}Yb IT decay (20 μs)

E(level)	J$^\pi$[†]	$T_{1/2}$	XREF	Comments
0.0	(1/2$^+$)	1.6 s *1*		%ε+%β^+=100; %εp>0 Decays by εp mode (1986To12,1989Ni02), but branching is unknown. $T_{1/2}$: from systematics it is expected that ^{151}Yb has two isomers: $s_{1/2}$ and $h_{11/2}$ and that the $s_{1/2}$ isomer is the ground state. Both the delayed proton decay and the ε decay of ^{151}Yb offer indirect evidence for existence of these two isomers. Both the delayed protons and the Tm K x ray show the same half-life within uncertainties, suggesting that the two isomers have approximately similar half-lives. Proton decay gives $T_{1/2}$=1.6 s *1* and X(t) in 1985Kl10 gives 1.6 s *2*. From γ(t), $T_{1/2}$=1.6 s *1* (1990Ak01) for g.s. and the isomer. Configuration=$\nu s_{1/2}$.
0.0+x	(11/2$^-$)	1.6 s *1*	A	%ε+%β^+≈100; %εp=?; %IT≈0.4 $T_{1/2}$: see comment for g.s. E(level): X≈740 (estimated from syst 1990Ak01). Configuration=$\nu h^{-1}_{11/2}$. Decays by εp also (1986To12,1989Ni02). %IT=0.4 (from syst of M4 transitions and $T_{1/2}$=1.6 s, 1990Ak01). The isomeric decay is expected through M4-M1 cascade via a $d_{3/2}$ neutron state at≈150 keV (1990Ak01), but no such transitions have been observed (1990Ak01) due to low production of ^{151}Yb and expected low %IT.
1531.3+x	(15/2$^-$)		A	
1734.7+x	(17/2$^+$)		A	J$^\pi$: E1 γ to (15/2$^-$).
1791.2+x			A	
1791.2+y		2.6 μs *7*	A	%IT≈100 E(level): level is above 1791.2+x. $T_{1/2}$: from 1993Ni05.
1791.2+z			A	E(level): level is above 1791.2+x.
1993.2+z?			A	
2165.4+z?			A	
2391+z	(23/2$^-$)		A	
2448+z	(27/2$^-$)	20 μs *1*	A	%IT=100 E(level): based on deexciting Eγ=57 *2* (1995Ni10).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{151}Yb Levels (continued)

E(level)	J^{π}[†]	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: from 1993Ni05. Other: 26 μs *5* (1987Br14). J^{π}: from analogy to ^{147}Dy and ^{149}Er. Probable configuration=$\pi h_{11/2}\otimes\nu h^{-1}_{11/2}$, seniority=3.

[†] From systematics of neighboring nuclides such as ^{147}Dy and ^{149}Er. See 1987Br14 and 1993Ni05 for discussion.

$\gamma(^{151}Yb)$

E_i(level)	J^{π}_i	E_{γ}	I_{γ}	E_f	J^{π}_f	Mult.	α[†]	Comments
1531.3+x	(15/2$^-$)	1531.3 *5*	100	0.0+x	(11/2$^-$)			
1734.7+x	(17/2$^+$)	203.4 *5*	100	1531.3+x	(15/2$^-$)	E1	0.0531	α(K)=0.044; α(L)=0.0067; α(M)=0.00150 Mult.: from α(K)exp=0.068 *18* (1995Ni10).
1791.2+x		57.1 *2*	55 *15*	1734.7+x	(17/2$^+$)			
		259.4 *3*	100 *15*	1531.3+x	(15/2$^-$)			
1993.2+z?		202.0[‡] *4*	100	1791.2+z				
2165.4+z?		172.2[‡] *4*	100	1993.2+z?				
2391+z	(23/2$^-$)	226.0[‡] *4*	9 *1*	2165.4+z?				
		599.9 *4*	100 *7*	1791.2+z				
2448+z	(27/2$^-$)	57 *2*		2391+z	(23/2$^-$)	[E2]	32 *6*	B(E2)(W.u.)=0.030 *6*

[†] 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.

[‡] Placement of transition in the level scheme is uncertain.

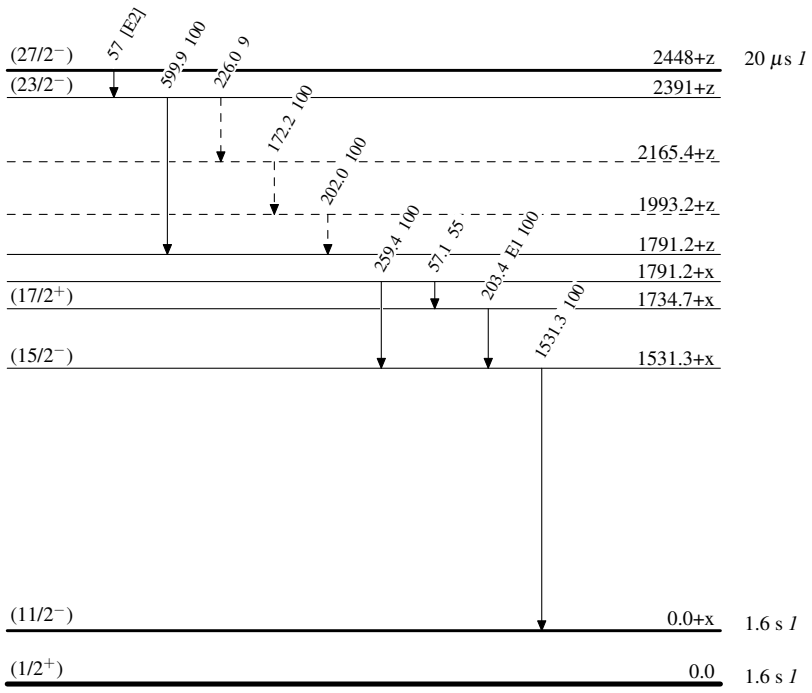
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{151}_{70}Yb_{81}$