^{103}Nb β^- decay 1984Sh03,1993Li28

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne	NDS 110, 2081 (2009)	1-Mar-2009

Parent: ^{103}Nb: E=0.0; J^π=(5/2$^+$); $T_{1/2}$=1.5 s *2*; Q(β^-)=5530 *30*; %β^- decay=100.0

1984Sh03: assignment based on mass separation and charge identification of fission fragments in ^{235}U(n,F). Measured: Eγ, Iγ, $\gamma\gamma$ and (K x ray)γ, $\gamma\gamma(\theta)$. Deduced: ^{103}Nb $T_{1/2}$, ^{103}Mo levels (1984Sh03).

1993Li28, 1990LiZT: assignment based on mass separation and charge identification of fission fragments in ^{235}U(n,F). Measured: Eγ, Iγ, $\beta\gamma$(t). Deduced: ^{103}Nb levels $T_{1/2}$ and Q.

1987Gr18: online mass separator LOHENGRIN, measured $\gamma\beta$, Q(β^-), Eβ, others: 1976Ah06, 1976KaYO, 1978Be51, 1981SeZW.

^{103}Mo Levels

The transitional quadrupole moment Q_t were obtained from γ half- life measurements.
For calculation of deformation parameters see 1993Li28.

E(level)	J^π[†]	$T_{1/2}$[‡]	Comments
0.0	(3/2$^+$)	67.5 s *15*	$T_{1/2}$: from 1977Ti02 via γ-decay curves.
102.561 *3*	(5/2$^+$)	435 ps *14*	β_2=0.34 *1* (1993Li28) Transitional quadrupole moment Q_t=3.84 *17* (1993Li28). $T_{1/2}$: others: 0.45 ns *16* (1985Se02), 1.7 ns *3* (1981SeZW).
241.12 *8*	(7/2$^+$)	108 ps *16*	Q=3.7 *3* (1993Li28) β_2=0.33 *3* (1993Li28) Transitional quadrupole moment Q_t=3.7 *3* (1993Li28).
346.55 *8*	(5/2$^-$)		
353.81 *11*	(7/2$^-$)	1.2 ns *1*	J^π: J^π=(9/2$^+$) proposed by (1984Sh03), in contradiction with the adopted value (7/2$^-$).
433.26 *16*	(9/2$^+$)	35 ps *24*	β_2=0.30 *12* (1993Li28) Transitional quadrupole moment Q_t=3.4 *14* (1993Li28).
456.09 *7*		24 ps *10*	
489.86 *14*			
526.13 *9*			
641.10 *8*		<10 ps	
687.47 *14*			
692.81 *16*			
746.23 *11*		<10 ps	
967.09 *9*			
1028.19 *13*			
1185.73 *13*			

[†] From Adopted Levels.
[‡] From delayed β-γ measurements (1993Li28).

β^- radiations

E(decay)	E(level)	Comments
4.34×10^3 *10*	1185.73	E(decay): from 1987Gr18, no branching given.
4.345×10^3 *15*	1028.19	E(decay): from 1987Gr18, no branching given.
4585 *90*	967.09	E(decay): from 1987Gr18, no branching given.
4765 *60*	746.23	E(decay): from 1987Gr18, no branching given.
(4.84×10^3 *3*)	692.81	
(4.84×10^3 *3*)	687.47	
4915 *35*	641.10	E(decay): from 1987Gr18, no branching given.
(5.00×10^3 *3*)	526.13	

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^{103}Nb β^- decay 1984Sh03,1993Li28 (continued)

β^- radiations (continued)

E(decay)	E(level)	Comments
(5.04×10^3 *3*)	489.86	
(5.07×10^3 *3*)	456.09	
(5.10×10^3† *3*)	433.26	E(decay): (5/2$^+$) to (9/2$^+$), so no significant feeding is expected.
(5.18×10^3† *3*)	353.81	
(5.18×10^3 *3*)	346.55	
5335 *70*	241.12	E(decay): from 1987Gr18, no branching given.
5445 *45*	102.561	E(decay): from 1987Gr18, no branching given.
(5.53×10^3† *3*)	0.0	

† Existence of this branch is questionable.

$\gamma(^{103}Mo)$

For $\gamma\gamma(\theta)$ results, see 1984Sh03.

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α#	Comments
102.561 *3*	100 *6*	102.561	(5/2$^+$)	0.0	(3/2$^+$)	(M1+E2)	0.7 *5*	E_γ: from 1979Bo26. α>0.6 from intensity balance in SF decay.
112.76 *17*	0.81	353.81	(7/2$^-$)	241.12	(7/2$^+$)			
138.5 *1*	13.5 *6*	241.12	(7/2$^+$)	102.561	(5/2$^+$)	(M1+E2)	0.24 *14*	
143.3 *2*	1.3 *3*	489.86		346.55	(5/2$^-$)			
192.1 *2*	0.54 *14*	433.26	(9/2$^+$)	241.12	(7/2$^+$)	(M1+E2)	0.08 *4*	
215.0 *1*	0.54 *14*	456.09		241.12	(7/2$^+$)			
236.8 *2*	1.6 *4*	692.81		456.09				
241.1 *2*	6.9 *6*	241.12	(7/2$^+$)	0.0	(3/2$^+$)			
244.0 *1*	1.1 *3*	346.55	(5/2$^-$)	102.561	(5/2$^+$)			
251.18 *9*	1.9 *4*	353.81	(7/2$^-$)	102.561	(5/2$^+$)			
330.7 *2*	0.8 *3*	433.26	(9/2$^+$)	102.561	(5/2$^+$)			
346.5 *1*	5.9 *7*	346.55	(5/2$^-$)	0.0	(3/2$^+$)			
353.4 *1*	5.0 *6*	456.09		102.561	(5/2$^+$)			
387.2 *2*	0.7 *3*	489.86		102.561	(5/2$^+$)			
423.6 *2*	2.6 *6*	526.13		102.561	(5/2$^+$)			
440.9 *2*	1.6 *3*	967.09		526.13				
446.2 *2*	0.81 *14*	687.47		241.12	(7/2$^+$)			
451.3 *3*	0.94 *14*	692.81		241.12	(7/2$^+$)			
456.2 *1*	8.8 *10*	456.09		0.0	(3/2$^+$)			
490.0 *3*	0.9 *4*	489.86		0.0	(3/2$^+$)			
505.1 *1*	7.8 *7*	746.23		241.12	(7/2$^+$)			
526.1 *1*	4.3 *7*	526.13		0.0	(3/2$^+$)			
538.5 *1*	34.0 *23*	641.10		102.561	(5/2$^+$)			
572.2 *2*	3.9 *6*	1028.19		456.09				
585.0 *2*	1.9 *4*	687.47		102.561	(5/2$^+$)			
590.4 *3*	1.8 *4*	692.81		102.561	(5/2$^+$)			
641.1 *1*	55 *3*	641.10		0.0	(3/2$^+$)			
643.6 *3*	3.2 *7*	746.23		102.561	(5/2$^+$)			
687.5 *3*	2.6 *6*	687.47		0.0	(3/2$^+$)			
729.7 *2*	2.2 *6*	1185.73		456.09				
746.3 *3*	11.6 *11*	746.23		0.0	(3/2$^+$)			
787.3 *4*	0.7 *4*	1028.19		241.12	(7/2$^+$)			
864.5 *2*	2.0 *6*	967.09		102.561	(5/2$^+$)			

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^{103}Nb β^- decay 1984Sh03,1993Li28 (continued)

$\gamma(^{103}Mo)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π
925.5 *2*	2.2 *6*	1028.19		102.561	$(5/2^+)$
945.1 *4*	0.7 *4*	1185.73		241.12	$(7/2^+)$
967.1 *1*	6.3 *10*	967.09		0.0	$(3/2^+)$
1028.0 *3*	2.3 *6*	1028.19		0.0	$(3/2^+)$
1083.0 *3*	2.0 *6*	1185.73		102.561	$(5/2^+)$
1185.6 *2*	1.2 *6*	1185.73		0.0	$(3/2^+)$

[†] No normalization possible as β branch to g.s. is unknown.

[‡] Mult suggested from level scheme. D+Q assumed M1+E2 but all values are tentative as no unambiguous J^π values could be given.

[#] 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.

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Decay Scheme

Intensities: Relative I_γ