^{84}Nb ε decay 2003Do01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. Kibedi and J. Timar	NDS 110,2815 (2009)	30-Sep-2009

Parent: ^{84}Nb: E=0; $J^\pi=(1^+,2^+,3^+)$; $T_{1/2}$=9.8 s *9*; Q(ε)=10200 *SY*; %ε+%$β^+$ decay=100.0

^{84}Nb-Q(ε): 10200 *300* (syst,2009AuZZ). Other: 9610 *360* (syst,2003Au03). Q(ε)(^{84}Nb)=7.2 MeV *4* from βγ coin experiment (1996Sh27) is lower by at least 2.3 MeV from the systematic value in mass evaluations (2009AuZZ,2003Au03).

^{84}Nb-J^π,$T_{1/2}$: from ^{84}Nb Adopted Levels.

2003Do01: ^{58}Ni(^{32}S,npαγ) at 94 MeV, FMA recoil separator. Measured Eγ, Iγ, γγ, βγ and βγγ coin. Deduced ε+$β^+$ feedings and log *ft* values.

1977Ko05: isotope produced by ^{58}Ni(^{32}S,npαγ). Only two gamma rays of 540.0 and 722.8 keV reported.

1996Sh27: measured βγ coin, deduced Q(ε).

Additional information 1.

α: Additional information 2.

^{84}Zr Levels

E(level)	J^π	$T_{1/2}$	Comments
0	0^+	25.8 min *5*	$T_{1/2}$: from Adopted Levels.
540.0 *1*	2^+		
1119.5 *1*	2^+		
1244? *1*	(0^+)		
1263.0 *4*	4^+		
1575.7 *3*	3^+		
1966.7 *4*			

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*†	I(ε+β+)†‡	Comments
(8233 *SY*)	1966.7	8.2 *14*	0.050 *11*	6.19 *13*	8.2 *14*	av Eβ=3.39×10^3 *15*; εK=0.0053 *7*; εL=0.00063 *9*; εM+=0.000140 *19*
(8624 *SY*)	1575.7	10 *4*	0.052 *22*	6.21 *20*	10 *4*	av Eβ=3.58×10^3 *15*; εK=0.0045 *6*; εL=0.00054 *7*; εM+=0.000120 *15* I(ε+$β^+$): from intensity balance (compiler). 2003Do01 give 12.0.
(8937 *SY*)	1263.0	5.9 *16*	0.027 *8*	6.52 *15*	5.9 *16*	av Eβ=3.74×10^3 *15*; εK=0.0040 *5*; εL=0.00048 *6*; εM+=0.000107 *13*
(8956# *SY*)	1244?	<4.4	<0.020	>6.7	<4.4	av Eβ=3.74×10^3 *15*; εK=0.0040 *5*; εL=0.00047 *6*; εM+=0.000106 *13*
(9080 *SY*)	1119.5	35 *3*	0.15 *2*	5.79 *10*	35 *3*	av Eβ=3.81×10^3 *15*; εK=0.0038 *5*; εL=0.00045 *6*; εM+=0.000101 *12* (579γ)(5000 *600* β) coin (1996Sh27) gives Q(ε)=7.1 MeV *6* in contradiction to the systematics value of 10200 *300* from mass adjustment (2009AuZZ).
(9660 *SY*)	540.0	39 *6*	0.14 *3*	5.88 *11*	39 *6*	av Eβ=4.09×10^3 *15*; εK=0.0031 *4*; εL=0.00037 *4*; εM+=8.3×10^{-5} *9* I(ε+$β^+$): from intensity balance (evaluators). 2003Do01 give 34.4. (540γ)(5700 *400* β) coin (1996Sh27) gives Q(ε)=7.2 MeV *4*.

† Since delayed-p emission is possible, and due to a large gap of ≈ 7 MeV between the highest known populated level and Q(ε) value, the ε+$β^+$ feedings and associated log *ft* values should be considered as approximate and only as upper limits for feedings

Continued on next page (footnotes at end of table)

^{84}Nb ε decay 2003Do01 (continued)

ε,β+ radiations (continued)

and lower limits for log *ft* values.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{84}Zr)

Iγ normalization: From sum Iγ(g.s.)=100 if Iβ(g.s.)=0 as indicated by the strong feeding of the 4+ level. Delayed-p emission is energetically possible but not known.

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α	Comments
456.2 *2*	7.6 *12*	1575.7	3+	1119.5	2+			
540.0 *1*	100 *2*	540.0	2+	0	0+	E2	0.00334 *5*	α(K)=0.00293 *5*; α(L)=0.000339 *5*; α(M)=5.89×10^{-5} *9*; α(N)=8.28×10^{-6} *12*; α(O)=5.50×10^{-7} *8*; α(N+..)=8.83×10^{-6} *13*
579.4 *1*	34 *2*	1119.5	2+	540.0	2+			
704‡ *1*	<5	1244?	(0+)	540.0	2+			
723.0 *3*	6.7 *17*	1263.0	4+	540.0	2+			I_γ: other: 23 *8* (1977Ko05).
1036.4‡ *5*	6.1 *15*	1575.7	3+	540.0	2+			
1119.6 *2*	13 *2*	1119.5	2+	0	0+			
1426.7 *3*	9.3 *15*	1966.7		540.0	2+			

† For absolute intensity per 100 decays, multiply by 0.885 *25*.
‡ Placement of transition in the level scheme is uncertain.

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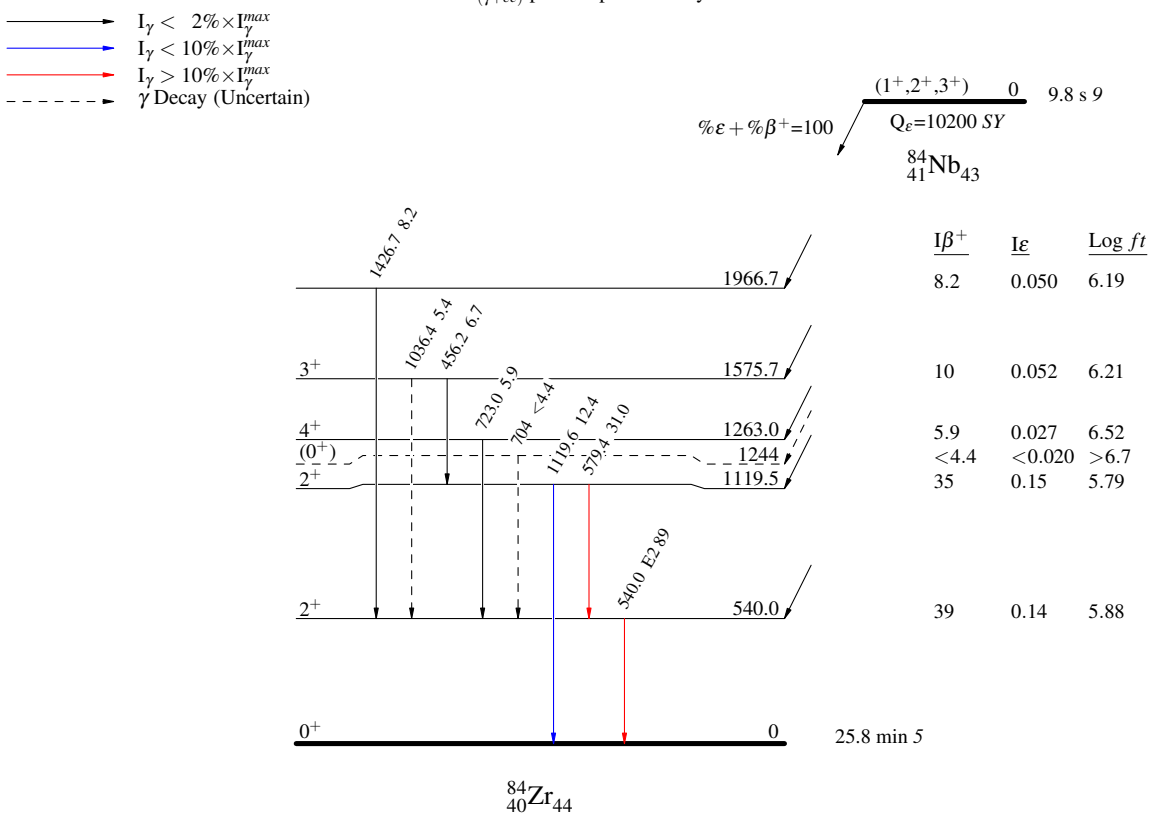
Decay Scheme

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



	Iβ+	Iε	Log *ft*
1966.7	8.2	0.050	6.19
1575.7	10	0.052	6.21
1263.0	5.9	0.027	6.52
1244	<4.4	<0.020	>6.7
1119.5	35	0.15	5.79
540.0	39	0.14	5.88