^{102}**Zr** β^- **decay:2.9 s**   **2007Ri01**

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	D. De Frenne	NDS 110, 1745 (2009)	31-Dec-2008

Parent: ^{102}Zr: E=0.0; $J^\pi=0^+$; $T_{1/2}$=2.9 s 2; Q(β^-)=4626 23; %β^- decay=100.0

^{102}Zr-Q(β^-): From mass measurements of Nb isotopes by 2007Ri01 and those of Zr isotopes by 2006Ha03.

2007Ri01:Measured Eγ, Iγ, $\gamma\gamma$, $\beta\gamma$ coin, xγ coin, Q(β^-) values using plastic scintillator for β rays and Ge detectors for γ rays and xrays.

Most of the data given here are from 2007Ri01 and data received through e-mail reply on January 30, 2007 from S. Rinta-Antila.(2008SiZZ) They are more recent and precise than the data of 1989SiZR.

^{102}Nb Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0.0+x	1$^+$	E(level): x=93 23 (2007Ri01).
20.37+x 9		
64.39+x 9	(2$^+$)	
93.95+x 17		
156.36+x 11		
160.72+x 21		
246.31+x 18		
258.43+x 15		
430.7+x 6		
599.49+x 8	1$^+$	
705.08+x 24	(1)	
940.5+x 4	(1)	
>941+x		

[†] From least-squares fit to measured Eγ's by the evaluator.

[‡] From Adopted Levels, gammas.

β^- radiations

E(decay)	E(level)	Iβ^-[‡#]	Log ft[†]	Comments
(1.8×10^3[&] 19)	>941+x			
(1.8×10^3[&] 19)	940.5+x	1.7 3	5.82 9	av Eβ=1588 11
(2.0×10^3[&] 20)	705.08+x	3.3 7	5.65 10	av Eβ=1701 11
(2.0×10^3[&] 20)	599.49+x	25 2	4.82 5	av Eβ=1751 11
(2.1×10^3[&] 21)	430.7+x	0.26 9	6.88 16	av Eβ=1832 11
(2.2×10^3[&] 22)	258.43+x	2.4 2	5.99 5	av Eβ=1914 11
(2.2×10^3[&] 22)	246.31+x	2.2 8	6.04 17	av Eβ=1920 11
(2.2×10^3[@&] 22)	160.72+x	<0.7	>6.6	av Eβ=1961 11 Iβ^-: 0.2 5.
(2.2×10^3[&] 22)	156.36+x	1.3 7	6.30 24	av Eβ=1963 11
(2.3×10^3[&] 23)	93.95+x	0.8 5	6.5 3	av Eβ=1993 11
(2.3×10^3[@&] 23)	64.39+x	2.1 21	>5.7	av Eβ=2007 11
(2.3×10^3[&] 23)	20.37+x	2.1 14	6.2 3	av Eβ=2029 11
(2.3×10^3[&] 23)	0.0+x	59 3	4.71 4	av Eβ=2038 11

[†] Values are deduced by the evaluator using "LOGFT" code available at www.nndc.bnl.gov; value of x is assumed as 0 for this

^{102}Zr β^- decay:2.9 s   **2007Ri01** (continued)

β^- radiations (continued)

calculation. From $\beta\gamma$ counting the ground state feeding upper limit was deduced to be 59% *3*. All values should be treated as lower limits since possible feedings to higher levels are unknown. For the calculation of conversion coefficients all low-energy transitions for which the multipolarity could not be determined experimentally are considered [M1] because from systematics and structure point of view M1 is a good guess as multipolarity.

‡ All values should be treated as upper limits since possible feedings to higher levels are unknown.

Absolute intensity per 100 decays.

@ Existence of this branch is questionable.

& Estimated for a range of levels.

$\gamma(^{102}$Nb)

Iγ normalization: Intensities listed by 2007Ri01 are per 100 decays of ^{102}Zr.
The $\gamma\gamma$ coin information is from e-mail reply of Jan 30, 2007 from S. Rinta-Antila (2008SiZZ).

E$_\gamma^\dagger$	I$_\gamma^{\dagger\#}$	E$_i$(level)	E$_f$	J$_f^\pi$	Mult.	$\alpha^@$	I$_{(\gamma+ce)}^{\ddagger\#}$	Comments
20.38 *9*	0.56 *11*	20.37+x	0.0+x	1$^+$	(E1)	10.3	6.3 *12*	α(K)exp=7.9 *25* (2007Ri01)
64.46 *13*	8.6 *10*	64.39+x	0.0+x	1$^+$	M1	0.781	15.3 *18*	α(K)exp=0.78 *16* (2007Ri01)
73.58 *14*	1.17 *14*	93.95+x	20.37+x		[M1]	0.535	1.80 *22*	
85.59 *12*	0.7 *3*	246.31+x	160.72+x		[M1]	0.349	0.9 *4*	
96.4 *5*	1.1 *2*	160.72+x	64.39+x	(2$^+$)	[M1]	0.250	1.38 *25*	
102.02 *17*	1.37 *15*	258.43+x	156.36+x		[M1]	0.214	1.66 *18*	
136.35 *22*	1.4 *6*	156.36+x	20.37+x		[M1]	0.096	1.5 *6*	
152.4 *60*	0.99 *40*	246.31+x	93.95+x				0.99 *40*	
156.14 *14*	3.4 *8*	156.36+x	0.0+x	1$^+$	[M1]	0.067	3.6 *8*	
225.35 *32*	0.87 *30*	246.31+x	20.37+x				0.87 *30*	
246.55 *26*	0.56 *8*	246.31+x	0.0+x	1$^+$			0.56 *8*	
258.52 *22*	0.69 *9*	258.43+x	0.0+x	1$^+$			0.69 *9*	
270.0 *5*	0.26 *9*	430.7+x	160.72+x				0.26 *9*	
^{x}362.9 *4*	0.9 *3*							In $\gamma\gamma$ coin with x-rays, 64γ, 136γ and 157γ. This transition is not assigned in the level-scheme figure of 2007Ri01.
442.3 *5*	0.49 *20*	599.49+x	156.36+x				0.49 *20*	
458.69 *21*	1.1 *4*	705.08+x	246.31+x				1.1 *4*	
535.13 *9*	10.7 *10*	599.49+x	64.39+x	(2$^+$)			10.7 *10*	
549.0 *5*	1.6 *5*	705.08+x	156.36+x				1.6 *5*	
599.48 *9*	13.9 *13*	599.49+x	0.0+x	1$^+$			13.9 *13*	
641.2 *8*	0.55 *20*	705.08+x	64.39+x	(2$^+$)			0.55 *20*	
875.8 *8*	0.6 *2*	940.5+x	64.39+x	(2$^+$)			0.57 *14*	
940.6 *4*	1.1 *2*	940.5+x	0.0+x	1$^+$			1.1 *2*	

† From data received through e-mail reply on January 30, 2007 from S. Rinta-Antila (2008SiZZ).

‡ Based on photon intensities and conversion coefficients deduced by the evaluator using BrIcc code available at www.nndc.bnl.gov
 For the calculation of conversion coefficients all low-energy transitions for which the multipolarity could not be determined experimentally are considered [M1]. For the calculation of absolute intensities 2007Ri01 assumed also M1 for low energy γ's with the exception of the 20.38 G where EKC pointed to E1.

Absolute intensity per 100 decays.

@ 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.

^{x} γ ray not placed in level scheme.

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Decay Scheme

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

Legend

I$_\gamma$ < 2%×I$_\gamma^{max}$
I$_\gamma$ < 10%×I$_\gamma^{max}$
I$_\gamma$ > 10%×I$_\gamma^{max}$
● Coincidence

0$^+$ 0.0   2.9 s 2
Q$_{\beta-}$=4626 23   %β^-=100.0
$^{102}_{40}$Zr$_{62}$

Iβ^- Log ft

1.7   5.82   (1)

3.3   5.65   (1)

25   4.82   1$^+$

0.26   6.88

2.4   5.99
2.2   6.04

<0.7   >6.6
1.3   6.30

0.8   6.5
2.1   >5.7   (2$^+$)

2.1   6.2
59   4.71   1$^+$

940.6 1.3
875.8 0.57

641.2 0.55
549.0 1.6
458.69 1.1

599.48 13.9
535.13 10.7
442.3 0.49

270.0 0.26

258.52 0.69
102.02 [M1]1.66
246.55 0.56
225.35 0.9
152.4 1.0
85.59 [M1]0.9

96.4 [M1]1.38
156.14 [M1]3.6
136.35 [M1]1.5

73.58 [M1]1.80
64.46 M1 15.3
20.38 (E1) 6.3

>941+x
940.5+x

705.08+x

599.49+x

430.7+x

258.43+x
246.31+x

160.72+x
156.36+x

93.95+x
64.39+x

20.37+x
0.0+x

$^{102}_{41}$Nb$_{61}$