

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	20-Jul-2015

$Q(\beta^-)=11216$ 13; $S(n)=3897$ 12; $S(p)=12570$ 5Y; $Q(\alpha)=7910$ 5Y 2012Wa38

Estimated uncertainties (2012Wa38): 300 for S(p), 400 for Q(α).

$Q(\beta^-)_n=4941$ 13, $S(2n)=9489$ 9, $S(2p)=28070$ 500 (syst) (2012Wa38).

1994Be24: ^{108}Nb produced and identified in $\text{Pb}(^{238}\text{U},f)$, $E=750$ MeV/nucleon, followed by on-line mass separation and time-of-flight method at GSI facility.

1996Pe25, 1996Me09: ^{108}Nb produced in $\text{U}(p,f)$, $E=50$ MeV in 1996Pe25 and $E=25,30$ MeV in 1996Me09; measured $T_{1/2}$, β^-n probability.

Additional information 1.

2009Pe06: ^{108}Nb formed by fragmentation of 120 MeV/nucleon ^{136}Xe beam from NSCL facility using Coupled Cyclotrons and A1900 fragment separator. The time-of-flight and transversal positions of each particle was measured using two plastic scintillators. The ΔE energy loss in a Si PIN detector was measured which, when combined with time-of-flight (tof) and transversal position measurements, allowed for an event-by-event identification of the transmitted nuclei. Transmitted nuclei and their β decays were measured using the β counting system consisting of four Si PIN detectors and a double-sided Si strip detector. β -delayed neutrons were measured in coincidence with β -decay precursor using neutron emission ratio observer (NERO) detector consisting of 60 proportional gas counter tubes embedded in polyethylene moderator matrix. The γ rays were measured with SeGA Ge detectors. Measured isotopic half-lives and delayed neutron emission probabilities Isotopic half-life was measured by 2009Pe06 from least-squares fit and maximum likelihood method of time differences of implantations and correlated β decay events.

2015Lo04: ^{108}Nb nuclide produced at RIBF-RIKEN facility in $^9\text{Be}(^{238}\text{U},F)$ reaction at $E=345$ MeV/nucleon with an average intensity of 6×10^{10} ions/s. Identification of ^{108}Nb was made by determining atomic Z and mass-to-charge ratio A/Q, where Q=charge state of the ions. The selectivity of ions was based on magnetic rigidity, time-of-flight and energy loss. The separated nuclei were implanted at a rate of 50 ions/s in a stack of eight double-sided silicon-strip detector (WAS3ABi), surrounded by EURICA array of 84 HPGe detectors. Correlations were recorded between the implanted ions and β rays. The half-life of ^{108}Nb isotope was measured from the correlated ion- β decay curves and maximum likelihood analysis technique as described in 2014Xu07. Comparison of measured half-lives with FRDM+QRPA, KTUY+GT2 and DF3+CQRPA theoretical calculations.

Mass measurement: 2011Ha48.

 ^{108}Nb LevelsCross Reference (XREF) Flags

- A ^{108}Zr β^- decay (77.4 ms)
 B ^{108}Nb IT decay (0.109 μs)

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	(2 ⁺)	198 ms 6	AB	$\% \beta^- = 100$; $\% \beta^- n = 6.3$ 5; $\% \beta^- 2n = ?$ $\% \beta^- n$: weighted average of 6.2 5 (1996Me09) and 8 2 (2009Pe06). Theoretical $T_{1/2} = 307$ ms, $\% \beta^- n = 16.6$, $\% \beta^- 2n = 0.0$ (2003Mo09). J^π : from $\log ft = 5.0$ to 3 ⁺ and 5.4 to 2 ⁺ . Possible configuration = $\pi 5/2[422] \otimes \nu 1/2[411]$ (1996Pe25). $T_{1/2}$: weighted average of 195 ms 6 (2015Lo04, correlated ion- β decay curves and maximum likelihood analysis technique), 220 ms 18 (2009Pe06, least-squares fit and maximum likelihood method of time differences of implantations and correlated β decay events, with systematic uncertainty=10 ms and statistical uncertainty=15 ms), 0.20 s 3 (1996Pe25, 0.19 s 2 in 1996Me09 from the same group as 1996Pe25, from β -gated and neutron singles multiscaling curves by fitting the total growth-in and decay periods of the time spectra).
64.3 5			B	
77.6 5			B	
166.6 5	(4 ⁻ ,5)	0.109 μs 2	B	$\% \text{IT} = 100$

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{108}Nb Levels (continued)

<u>E(level)</u>	<u>J^π</u>	<u>T_{1/2}</u>	<u>XREF</u>	<u>Comments</u>
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J^π: assigned by [2012Au07](#) based on decay pattern.
 T_{1/2}: from γ(t) method ([2012Ka36](#)).

γ(^{108}Nb)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ</u>	<u>I_γ</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>α[†]</u>
64.3		64.3 5	100	0.0	(2 ⁺)		
77.6		(14)		64.3			
		77.6 5	100 2	0.0	(2 ⁺)	D	
166.6	(4 ⁻ ,5)	89.0 5	100.0 18	77.6		(E2)	1.77 4
		102.2 5	33.9 18	64.3			

† Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ-ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)

