

Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	10-Jun-2015

$Q(\beta^-)=9450$ SY; $S(n)=3430$ SY; $S(p)=15510$ SY; $Q(\alpha)=-9270$ SY [2012Wa38](#)

Estimated uncertainties ([2012Wa38](#)): 300 for $Q(\beta^-)$, 360 for $S(n)$ and $Q(\alpha)$, 590 for $S(p)$.

$Q(\beta^-n)=3860$ 300, $S(2n)=8940$ 300, $S(2p)=30240$ 590 (syst, [2012Wa38](#)).

[1994Be24](#), [1998Do08](#): ^{107}Zr produced in $\text{Pb}(^{238}\text{U},\text{F})$, $E=750$ MeV/nucleon reaction and identified by time-of-flight at GSI.

[1997So07](#): ^{107}Zr produced in $^{208}\text{Pb}(^{238}\text{U},\text{F})$, $E=20$ MeV/nucleon.

[2009Pe06](#): ^{107}Zr formed by fragmentation of ^{136}Xe beam at 120 MeV/nucleon at 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.

[2011Ni01](#): ^{107}Zr nuclide produced in $\text{Be}(^{238}\text{U},\text{F})$ reactions at $E=345$ MeV/nucleon produced by the cascade operation of the RBIF complex of accelerators at RIKEN. Target= 550 mg/cm². Identification of ^{107}Zr made on the basis of magnetic rigidity, time-of-flight and energy loss. The separated nuclei were implanted in a nine-layer double-sided silicon-strip detector (DSSSD). Correlations were recorded between the heavy ions and β rays. The half-life of ^{107}Zr isotope was measured from the correlated ion- β decay curves and maximum likelihood analysis technique. In the analysis of the decay curve, β -detection efficiency, background rate, daughter and granddaughter (including those populated in delayed neutron decays) half-lives, and β -delayed neutron emission probabilities were considered. Comparison of measured half-lives with FRDM+QRPA and KTUY+GT2 calculations.

[2015Lo04](#): ^{107}Zr nuclide produced at RIBF-RIKEN facility in $^9\text{Be}(^{238}\text{U},\text{F})$ reaction at $E=345$ MeV/nucleon with an average intensity of 6×10^{10} ions/s. Identification of ^{107}Zr 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 ^{107}Zr 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.

[Additional information 1.](#)

 ^{107}Zr Levels

E(level)	$T_{1/2}$	Comments
0	146 ms 4	$\% \beta^- = 100$; $\% \beta^- n \leq 23$ (2009Pe06) Theoretical $\% \beta^- n = 1.5$ (2003Mo09). E(level): it is assumed that the measured half-life corresponds to the g.s. of ^{107}Zr . $T_{1/2}$: weighted average of 150 ms 3 (2015Lo04), 138 ms 4 (2011Ni01) and 150 ms +40–30 (2009Pe06). Method: analysis of the (ion) β -correlated decay curve. J^π : $1/2^+$ in theoretical considerations (1997Mo25).