

Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	11-Jun-2021

S(n)=14110 SY; S(p)=-710 SY; Q(α)=-1960 SY [2021Wa16](#)

Estimated uncertainties ([2021Wa16](#)): $\Delta S(n)=640$, $\Delta S(p)=520$, $\Delta Q(\alpha)=560$.

S(2p)=1480 500, Q(ϵ)=15610 500, Q(ϵp)=10880 500 (syst, [2021Wa16](#)). S(2n)=31180 (theory, [2019Mo01](#)).

[2017Su31](#): ^{72}Rb nuclide produced and identified in $^9\text{Be}(^{124}\text{Xe}, X), E(^{124}\text{Xe})=345$ MeV/nucleon fragmentation reaction at RIBF-RIKEN facility. Measured (implants) β correlated events using BigRIPS and ZeroDegree spectrometers for the separation and tagging of nuclei through event-by-event analysis to identify atomic number Z and A/q (atomic mass/charge) ratio by B ρ -tof- ΔE technique, B ρ measured using parallel-plate avalanche counters, tof by plastic scintillators, and ΔE by ionization chambers. The secondary ion beam was finally implanted into the active silicon stopper WAS3ABi with subsequent detection of β^+ , and proton-delayed γ -rays using the EURICA HPGe detector array. Deduced half-life of ^{72}Rb g.s. decay. Total of 14 events were ascribed to ^{72}Rb in the present experiment. Deduced half-life of 103 ns is consistent with its proton-unbound character with S(p)=-710 keV 520 (syst, [2017Wa10](#)).

[2019Si33](#): calculated g.s. configuration and compared with proton decay of ^{76}Y .

[Additional information 1](#).

 ^{72}Rb Levels

E(level)	T _{1/2}	Comments
0	103 ns 22	$\%p=?$; $\%\epsilon+\%\beta^+=?$ Proton decay mode of ^{72}Rb is expected to be dominant, as S(p) value is negative from a systematic trend (2021Wa16), and theoretical T_{1/2}(β decay)=28.4 ms (2019Mo01). E(level): observed events assumed to correspond to the g.s. of ^{72}Rb. T_{1/2}: estimated by 2017Su31, based on time-of-flight of 769.0 ns through the BigRIPS and the ZeroDegree spectrometers, and comparison of expected activity with the measured yield for ^{72}Rb, where the expected activity was determined from quadratic interpolation of the measured yields for neighboring rubidium nuclides, giving expected 10020 230 events versus 14 observed events, resulting in estimated half-life of 81-124 ns. J$^\pi$: from S(p) and finite-range droplet model and shell model calculations, 2017Su31 suggested the proton transition is either 5⁺ to 5/2⁻ state in ^{71}Kr, or 9⁺ to 9/2⁺ state in ^{71}Kr, with preference for the former assignment. From density functional theory calculations using Skyrme functional UNEDF0, and comparison with the structure and decay of ^{76}Y g.s., 2019Si33 proposed oblate ground state for ^{72}Rb, with deformation $\beta=-0.14$, and the most likely configuration=$\pi 3/2[321]\otimes \nu 1/2[321]$, J$^\pi=1^+$ for the g.s. from G-M rule, in agreement with established 1⁺ g.s. of mirror nucleus ^{72}Br. However, 2019Si33 did not rule out the possibility that the observed decays in both the nuclides may be due to excited states, with a possible 5⁺ state in both the nuclei. Other: 1⁺ or 8⁺ from $\Omega_p=7/2^+$ and $\Omega_n=9/2^+$ (2019Mo01, theory).