

New neutron lifetime measurements with the big gravitational trap and review of neutron lifetime data

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Mean neutron lifetime is one of the most important physical constants which serves for determining parameters of weak interaction and predictions of primordial nucleosynthesis theory. There is still unsolved problem of 3.9 standard deviation discrepancy of measurements with beam method and storage method. In our experiment the measurements of neutron lifetime are carried out using method of storing neutrons in material trap with gravity barrier on top. Covering of the trap walls is made of hydrogenless fluorine-containing polymer fombling-grease UT-18. Covering stability to multiple cooling to 80 K and heating to 300 K was tested. The result of the measurements is $\tau_n=881.5\pm 0.7_{\text{stat}}\pm 0.6_{\text{syst}}$ s which is in agreement with conventional value 880.2 ± 1.0 s presented in Particle Data Group. In conclusion the analysis of available data on measurements of neutron lifetime will be presented.

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