

Neutron Lifetime Puzzle



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UCNProBe a beam-type experiment using ultracold neutrons

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UCNProBe is an upcoming experiment at Los Alamos National Laboratory designed to measure the lifetime of a free neutron, τ_n . Currently, there is a significant discrepancy of about 10 seconds (4.5 sigma) between the two primary methods used for this measurement. One approach involves using a cold neutron beam to detect the charged products of neutron beta decay. The other relies on ultracold neutrons (UCN), which are stored in physical or magnetic traps. UCNProBe will follow the beam-type measurement method but uniquely incorporate UCN characteristics. In this setup, UCN will be confined within a material bottle made of deuterated polystyrene box that will also serve as an in-situ detector for electrons from the beta decay. For neutron counting, a boron-coated YAP:Ce crystal scintillator will be used. This presentation will provide an overview of the experiment and the latest updates on its development.

Author: KRIVOS, Martin (Los Alamos National Laboratory)

Presenter: KRIVOS, Martin (Los Alamos National Laboratory)

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