

The Neutron Lifetime Puzzle

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The neutron lifetime is a fundamental parameter in nuclear and particle physics, with implications for Big Bang nucleosynthesis, weak interaction studies, and searches for new physics beyond the Standard Model. Over the past decades, increasingly precise experiments have been performed using two main approaches: the “bottle” method, which traps ultracold neutrons, and the “beam” method, which counts decay products in a cold neutron beam. Despite significant progress, a persistent discrepancy between these techniques remains unresolved. This talk will provide an overview of the experimental principles, recent advances, systematic challenges, and future directions in neutron lifetime measurements.

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