

# Beyond the Standard Model: Exploring Enigmas with Beta Decay\*

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The use of exotic states of matter allows us to probe the underlying symmetries of the universe to ever greater precision and expose shortcomings of the Standard Model of particle physics (SM), arguably the most successful physical theory created to date. Radioactive ion beams (RIB), in particular, significantly expand the number of available experimental systems to address the SM's lack of sufficient CP-symmetry violation to explain the matter-antimatter asymmetry, the unknown mass mechanism of neutrino's, the nature of dark matter and a host of equally puzzling questions in the weak interaction. Through precise measurements of a low energy process such as (nuclear) beta decay, several different channels for exotic currents are available given sufficiently precise theoretical predictions. In this talk, I will review the significance of nuclear beta decay as a powerful tool in the quest for beyond SM physics and highlight recent advances.

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