

Precision Frontier from Nuclear Decay

Monday, November 25, 2024 10:50 AM (30 minutes)

Nuclear decay has been utilized for decades to study weak interaction and structure of nuclei. In particular, it has served as a probe of New Physics through a high-precision measurement for the coefficient of ρ -angular correlation, Fierz interference term, and asymmetry. Combining the precision frontier with the high-energy one from LHC constrains the coupling of exotic weak current at per-mil level, which is equivalent to a hypothetical TeV-mass particle search. The unitarity test of Cabibbo-Kobayashi-Maskawa (CKM) matrix is another exemplar of the crossroad of two frontiers. Here we have focused on the extraction of $|V_{ud}|$, which can be obtained directly from the β -decay properties of nuclei. A recent experiment at the INFN Legnaro National Laboratory aiming to measure the branching ratio of ^{10}C superallowed decay will be presented.

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Session Classification: CENS