

PRECISION MEASUREMENTS OF NEUTRON DECAY WITH NOMOS AT PERC

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Precision measurements of neutron beta decay allow searching for physics beyond the Standard Model of particle physics. An accuracy of 10^{-4} in the observables corresponds to energy scales of 1 – 100 TeV for new particles and interactions; far above the production threshold at the LHC. To achieve this accuracy, a novel experimental technique is developed: R×B spectroscopy. An R×B spectrometer measures the momentum of charged particles by their drift in a circular magnetic field. This new, accurate method of spectroscopy will be applied to determine several correlations between decay products in neutron decay. For measurements at ultimate statistics, the R×B spectrometer will be installed at PERC, a new facility at the FRM II in Garching/Germany that collects electrons and protons from a large neutron decay volume. A final goal is to measure or set limits on the Fierz interference term. This term is forbidden in the Standard Model and has not yet been measured with neutrons. A non-zero value would indicate that yet unknown charged Higgs bosons, sleptons, or leptoquarks were exchanged instead of the Standard Model W boson. Besides the physics motivation, the concept and status of PERC, and the measurement principle and physics programme of NoMoS are presented.