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(I) The P2 experiment at MESA - A high precision measurement of the weak mixing angle

Monday 19 June 2023 16:00 (30 minutes)

The weak mixing angle can be measured in parity-violating elastic electron-proton scattering. The aim of the P2 experiment is a very precise measurement of the weak mixing angle with an accuracy of 0.15% at a low four-momentum transfer of Q2 = 4.5x10^{-3} GeV^2. In combination with existing measurements at the Z pole with comparable accuracy, this comprises a test of the standard model with a sensitivity towards new physics up to a mass scale of 50 TeV. In addition to the measurement using a liquid hydrogen target, other targets, such as carbon and lead, are considered for measuring parity-violating elastic electron scattering. The experiment will be built at the future MESA accelerator in Mainz. In this talk, the motivation and challenges for these measurements will be discussed.

Keyword-1

Standard Model Test

Keyword-2

Electron scattering

Keyword-3

Fundamental Symmetries

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