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(I) The MOLLER Experiment: a precision electroweak probe

Tuesday 20 June 2023 09:30 (30 minutes)

The MOLLER experiment at Jefferson Lab aims for an ultra-precise determination of the weak mixing angle $\sin^2\theta_W$ by measuring the parity-violating asymmetry A_{PV} in polarized electron-electron (Moller) scattering. For the approved 88 calendar week run, the proposed accuracy on A_{PV} is 0.7 parts per billion corresponding to an overall relative measurement accuracy of 2.4% for the electron's weak charge and 0.1% for the weak mixing angle. The measurement will enhance our understanding of fundamental symmetries of the electroweak interaction and provide a powerful search for physics Beyond the Standard Model. MOLLER represents a 4th generation parity violation experiment at Jefferson Lab and has an experienced collaboration working closely with integrated lab management team. The project is fully funded and on schedule for assembly in Hall A starting in early 2025. This talk will give an introduction to MOLLER physics motivations and reach, present details of the apparatus and experimental techniques, and conclude with a brief progress update on status and plans.

Keyword-1

weak mixing angle

Keyword-2

precision measurement

Keyword-3

electroweak physics

Primary author: MCNULTY, Dustin (Idaho State University)

Presenter: MCNULTY, Dustin (Idaho State University)

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