

An Ultra-precise Measurement of the Weak Mixing Angle with a 11 GeV Electron Beam at Jefferson Laboratory

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May/June 2010

Abstract

The MOLLER collaboration at Jefferson Lab plans to perform an ultra-precise measurement of the weak mixing angle at low Q^2 from measurements of the parity-violating electroweak asymmetry in Møller scattering. If carried out with sufficient accuracy, this measurement would complement potential discoveries at the Large Hadron Collider. In addition, such measurements are necessary in order to comprehensively search for new dynamics at the TeV scale. The proposed precision on the weak mixing angle $\sin^2\theta_W$ is comparable to the single best measurement at e^+e^- colliders and accesses the contact interaction scale $\Lambda_{ee} \sim 25$ TeV. In this presentation, we discuss the motivating physics, experimental design, and status of the MOLLER project.