

Measurement of Lepton-Charge Asymmetry Using a Positron Beam at Jefferson Lab

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In testing the Standard Model or searching for beyond-the-Standard Model (BSM) physics, many experiments focus on the measurement of the weak mixing angle. The weak mixing angle is the parameter that unifies the electromagnetic and weak interactions, but only in the SM framework. To investigate the limit of the SM, it is thus important to measure all neutral current couplings, such as electron-electron AV couplings through Moller scattering, electron-quark AV couplings through elastic parity-violating electron scattering, and electron-quark VA couplings through parity-violating deep inelastic scattering. If one can compare the scattering cross section difference between electron and positron deep inelastic scattering, it is also possible to measure the so-called lepton-charge (LC) asymmetry that is directly proportional to the electron-quark AA couplings, the C3q. In this talk I will present the formalism of DIS PV and LC asymmetries, their present measurement status, the possibility of A_{LC} measurements should a positron beam becomes available at JLab using the planned SoLID spectrometer, along with difficulties of such measurements from both experimental and theoretical aspects.

Submitted on behalf of a Collaboration?

Yes

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