Contribution ID: **709** Type: **Invited Speaker / Conférencier invité**

High Precision Weak Charge Measurements using Parity Violating Electron Scattering: Looking for Signatures of New Physics at the Precision Frontier

Wednesday, June 17, 2015 2:15 PM (30 minutes)

Measurements of the parity violating electron-proton and electron-electron asymmetries in the number of scattered electrons can be extremely sensitive probes for signatures of new physics beyond the standard model up to mass scales as high as $\Lambda/g \simeq 7.5\,TeV$. The basic reason for this is that the measured asymmetry has a simple and, within the Standard Model (SM), precisely calculated relation to the weak charges of the proton and the electron (more so in the latter case) and that the weak charges are fundamental and suppressed/small parameters of the SM. To do this, however, a number of significant experimental challenges have to be overcome. Specifically, the small, part per billion level, asymmetries require very high statistics to achieve the necessary precision and very tight control of systematic effects to achieve the desired accuracy. I will discuss two experiments that fall into this category: I will provide a brief update on the status of the QWeak experiment (electron-proton), which is currently in the final analysis stages, and I will provide an update on the development status of the planned MOLLER experiment (electron-electron). I will provide an overview of the new physics sensitivities and complementarity of the two measurements.

Primary author: GERICKE, Michael (University of Manitoba)

Presenter: GERICKE, Michael (University of Manitoba)

Session Classification: W2-4 Testing Fundamental Symmetries I (DNP-PPD) / Tests de symétries fondamentales I (DPN-PPD)

Track Classification: Nuclear Physics / Physique nucléaire (DNP-DPN)