

THE Q_{WEAK} EXPERIMENT AS A TEST OF THE STANDARD MODEL *

A. Micherdzinska[†] for the Q_{weak} Collaboration

University of Winnipeg, Winnipeg, MB R3B 2E9

The Q_{weak} experiment will provide the first measurement of the proton's weak charge (Q_W^p), by measuring the parity-violating asymmetry in elastic electron-proton scattering at very small momentum transfer: $Q^2 = 0.03(GeV/c)^2$. Measurement of Q_W^p will in turn constitute a precision measurement of the weak mixing angle ($\sin^2 \theta_W$), at low energy, which is sensitive to new physics beyond the Standard Model. The experiment will be conducted at the Thomas Jefferson National Accelerator Facility in Newport News, VA in 2010. The goal of this experiment is a 4% measurement of Q_W^p , which corresponds to a 0.3% measurement of $\sin^2 \theta_W$. To achieve this goal systematic effects needs to be under control.

I will present the physics motivation of the Q_{weak} experiment, experimental setup and discuss expected error budget for Q_W^p determination. As the dominant experimental uncertainty is the determination of the electron beam polarization. I will focus on the construction of the electron detector Compton polarimeter for an accurate measurement of the beam polarization. Our group is developing a new technology: application of polycrystalline diamond in an electron Compton polarimeter. I will also present the most recent update on a current status of the experiment preparation.

* Work supported by the Natural Sciences and Engineering Research Council of Canada.

[†] *E-mail*: Presenting.amicherd@nuclear.uwinnipeg.ca