

# Department of Theoretical Physics

## Special Free Meson Seminar

- Speaker* : Dipangkar Dutta  
(Mississippi State Univ.)
- Topic* : The Q-Weak Experiment: A TeV scale  
Precision Test of the Standard Model  
with Parity Violating Electron Scattering  
or  
Who Needs the Large Hadron Collider
- Day, Date & Time* : Tuesday, December 23, 2008  
at 2:30 p.m.
- Place* : AG 69

### *Abstract*

A new high precision measurement of parity violation in electron-proton scattering (the Q-Weak Experiment) is under preparation at the Thomas Jefferson National Accelerator Facility (Jefferson Lab). Parity violation in electron scattering is a consequence of the weak nuclear force, making it uniquely sensitive to the weak charge of the proton. The Standard Model prediction for the weak charge of the proton will be tested with unprecedented precision in the QWeak experiment, making it a search for “New Physics” beyond the Standard Model.

The QWeak experiment will rely on a continuous, non-destructive monitoring of the spin-polarization of the electron beam. This task will be performed by a high precision polarimeter (known as a Compton polarimeter). The Medium Energy Group at MSU is building a diamond micro-strip detector for the Compton polarimeter. The diamond detector technology was chosen because of its well known ability to withstand high doses of radiation. It is the state-of-the-art in solid-state detector technology and will be the first such detector to be used at Jefferson Lab.

I will discuss the QWeak experiment, its role in the ongoing search for “New Physics”, and the prototype diamond micro-strip detector developed at MSU.

*(Saumen Datta)*