Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

Precision Target Mass Monitoring in the Antineutrino Detectors of the Daya Bay Reactor θ_{13} Experiment ALEXANDER GREEN, University of Wisconsin - Madison, DAYA BAY COLLABORATION — The Daya Bay Reactor Neutrino Experiment is designed to measure the neutrino mixing angle θ_{13} with a sensitivity of $sin^2 2\theta_{13} < 0.01$. The experiment consists of eight cylindrical antineutrino detectors filled with 20 tons of gadolinium-doped liquid scintillator as the target medium, surrounded by liquid scintillator and mineral oil. One of the dominant systematic errors of the measurement is the uncertainty of the detector target mass. To achieve the experimental sensitivity the detector target mass will be measured to better than 0.1%. A network of sensors is being developed, which will be mounted in the antineutrino detectors to monitor the liquids inside the detector during data taking with high precision. This instrumentation consists of temperature sensors, inclinometers, capacitance liquid level sensors and ultrasonic liquid level sensors on an RS-485 network. We report on the design, fabrication and testing of this instrumentation system and its integration into the experiment's flow control system.

Alexander Green
University of Wisconsin - Madison

Date submitted: 31 Jul 2010 Electronic form version 1.4