

# 2010 Summer Research Experience for Undergraduates Program in REU Solar and Space Physics

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**Title:** FPI Instrumentation Control Software

**Abstract:**

The FPI-Antarctica project was designed to develop software interface to control the Fabry-Perot Interferometer (FPI) instrumentation to be installed at Palmer Station, Antarctica. The FPI instrument is designed to measure mesospheric and lower thermospheric tidal waves. The FPI-Antarctica project will continue the long-term observations of neutral winds in the mesosphere and lower thermosphere to study tides, ion-neutral interactions, and magnetospheric-ionospheric couplings. The FPI consists of a Sky Scanner, Filter Wheel, Focus Mechanism, Etalon Chamber, and a CCD camera. The software to control FPI-Antarctica was developed at NCAR using C++. Similar software exists from the previous FPI-China project so modifications for the camera and filter wheel were incorporated. The camera used for this project is a Princeton Pro-EM 1024B CCD camera. One of the features of this camera is that it has an electron amplification circuit to multiply the number of the electron in each pixel so to reduce the readout noise. Code was written to utilize this feature multiplying the amplification of the Camera by a default factor of 150. In addition to the camera, the Focus Mechanism automatically adjust to a different focal length for one of the eight filters on the Filter Wheel, since each filter has a different wavelength of light adjustments are needed. For FPI-Antartica, the software interface now controls all hardware and handles all data collection autonomously.