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Physics 335 Project Proposal  
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The MTest Pixel telescope is a device currently being developed for use in the meson test beam at Fermi National Accelerator Laboratory. The purpose of the device is to allow for testing of detector components under development for possible use in the International Linear Collider. The pixel telescope is a box with pixel detectors at both ends. The telescope will have an aperture size of 3.5cm x 3.5 cm, comprised of 270 pixels, where each pixel is  $50\mu \times 400\mu$ . Each end of the box will have at least two stations, with pixels oriented for precision in the transverse direction. The stations are made up of 3 modules of a pixel sensor bump-bonded to a readout chip.

The ILC detector prototype to be tested in the telescope will be placed close to one end of the telescope. Particle hits will then be measured at the far end and the near end of the telescope. From these results it will be possible to determine when and where particles have hit the prototype. It is then possible to test efficiency of the prototype by, for example, determining if a hit was recorded in the device at that location.

My role in this project will be to ready the pixel telescope for use in the test beam. Currently we are waiting on the return of the pixel sensors from bump bonding in Finland. In the meantime there are a number of tasks to be accomplished.

In the MTest facility the box sits on arms that can be raised and lowered to move the box into the path of the beam line. One task I will be working on is recommissioning the computer controls for the stepping motors which control the arms to move the box. In theory, computer controls already exist, but they have not been used recently, and thus will need to be tested and calibrated. The controls should be capable of moving the box in micron increments, and should be calibrated so that we can measure position of the box.

Another task to be completed is the recommissioning of computer controls for the power supplies to the telescope. We need to control the bias voltage on the sensors, and power distribution to pixel stations. We will monitor the leakage current, which, if everything is working properly, should correlate with temperature of the sensors.

We will also need to develop a system to monitor environmental conditions inside the box in the MTest facility. This will involve buying or building sensors to examine temperature and humidity, and perhaps monitor other variables such as coolant temperature, and coolant flow.