Diffraction

Confirm the single slit diffraction pattern using the laser, variable single slit, and camera (with Scion software).

There are two set-ups. On one, the slit width can be varied and measured with the micrometer (although there is an offset in this device). In the other, the slit widths are fixed.

Too much light illuminating the detector will saturate it. Pastic filters can be used to adjust the light level on the array. These are calibrated attenuators (called neutral density filters in optics) and their attenuation is given on an exponential scale. A value of N.D. 1 indicates attenuation by a factor of 10 while 2 indicates an attenuation by a factor of 100. By using these filters you should be able to compare the zero order peak intensity with the higher order peaks assuming the camera is linear and not saturated.

To run the software go to all programs and Scion image and click on Scion image. Click on Special and choose Start capturing from the pull-down menu. To get a digital file of the data click on the image and drag a rectangle over the area of interest. Go to Analyze and Plot profile to get a numerical display. To rotate the image go to Edit and choose "Scale and rotate." To get a list of the data, after "Plot profile" go to Export and choose .txt extension.

A transparent scale next to the diffraction image may be used to calibrate the distance.

Suggestions:
1.Measure the diffraction pattern width and intensity for different slit widths and compare with theory.

Perform a proper error analysis on your measurements.