HOMEWORK SET 5

Due September 28, Monday

1. The New Solar Telescope (NST) at Big Bear City, CA, is the largest aperture solar telescope being operated by NJIT. NST has a 1.6-m primary mirror with a *f* ratio of f/2.4. Angular diameter of the Sun is about 32'. Find the physical size of the Sun on its prime focal plane.

2. (a) Using the Rayleigh criterion, estimate the angular resolution limit of the human eye at 550 nm. Assume that the diameter of the pupil is 5-mm.

   (b) Compare your answer in part (a) to the angular diameters of the Moon and Jupiter. You may find the data in Appendix C helpful.

   (c) What can you conclude about the ability to resolve the Moon's disk and Jupiter's disk with the unaided eye?

3. The New Technology Telescope (NTT) is operated by the European Southern Observatory at Cerro La Silla. This telescope was used as a testbed for evaluating the adaptive optics technology used in the VLT. The NTT has a 3.58-m primary mirror with a focal ratio of f/2.2.
   (a) Calculate the focal length of the primary mirror of the NTT.
   (b) What is the value of the plate scale of the NTT?
   (c) ε Bootes is a double star system whose components are separated by 2.9". Calculate the linear separation of the images on the primary mirror focal plane of the NTT.