

Astronomy 634: Astronomical Instrumentation Technology

Homework 1: Due date Jan. 18, 2019 at 1:30 pm. Please hand in this homework via email to hodapp@ifa.hawaii.edu with the subject line “ASTR 634 homework 1”. Homework submissions time-stamped after 1:30 pm on the due date in my email system will be ignored. I will discuss the homework at the beginning of the class on Jan. 18, and submissions after that time would obviously have an unfair advantage.

This homework assignment is a problem that we have actually encountered when preparing for nights of visual observing at the UH 88” telescopes for outreach to “Friends of the IfA”.

What eyepiece would be optimal for visual observations of deep sky objects? Is such an eyepiece available commercially?

Considering the properties of the human eye, discuss the best choice of magnification. Discuss what would happen if the magnification is too low or too high. Consider the fact that we have a central obscuration in the light path and its effect on the exit pupil. Describe how the stars would look in a night of median seeing. Would they appear as sharp points of light, or fuzzy due to seeing? Consider temporal variations in seeing and maybe read up on “lucky imaging” via Google.

Not all the information required for this homework has been presented in the class. Search for what you need to know. A Google search for keywords such as “telescope exit pupil”, “lucky imaging”, “Robo AO” etc. will lead to useful material.

Be as quantitative as possible in discussing the solution. In the end, identify a specific technical solution or commercial item that gives close to an optimum viewing experience.

For this homework problem, there is a range of acceptable conclusions. The main criterium for a good grade is that you identify the main issues, explain your assumptions, and arrive at a reasonable answer.