Exercises Astronomical Observing Techniques, Set 4

Exercise 1

a) Calculate the theoretical resolution (in arcsec) of a 3.6m telescope observing at a wavelength of 500 nm.

b) The Fried parameter (r_0) of the atmosphere is 20 cm at a wavelength of 500 nm. Calculate resolution of the telescope (in arcsec) looking through the atmosphere.

c) What is resolution (in arcsec) at 2 μm using the information in 1b?

d) A 2k $\times$ 2k CCD camera is placed in Prime Focus operating at 500 nm. The telescope has a focal length (f) of 10 m, we want to have 4 pixels per resolution element using the atmospheric conditions described above (1b). Calculate the pixel size and the resulting Field of View (FOV).

Exercise 2

Discuss the advantages/disadvanges of the Coudé over the Nasmyth focus.

Exercise 3

Discuss the advantages/disadvantages of space observations vs ground observations.

Exercise 4

Show that a rotating liquid mirror has a paraboloid shape. The mirror rotates with an angular velocity ω. Use x for the horizontal distance to the centre of the liquid mirror and y for the vertical height.