Lab #1: Setting up a small telescope

The purpose of the lab is to get you used to setting up, operating, and taking down the small telescopes at the Fick Observatory. There are four permanent piers just South of the main building at Fick Observatory. One telescope, the Celestron-14, is permanently mounted inside its own small observatory. The other three must be mounted on the piers each observing session. Working in groups of two select one of the telescopes to work with and follow the procedure below.

1. Setup the Telescope

   a) For each of the two Meade-8s, first attach one bolt to the base and slip it onto the wedge on the pier. Tighten the bolt and add one more bolt. Attach the power cord through a hole in the base and plug it in to the outlet at the base of the pier. Attach the eyepiece adaptor to the telescope and insert an eyepiece.

   b) For the Meade-10 two bolts should already be attached to the base. Slip the base onto the pier so that the part with the switches faces south (or away from the ground). Tighten the bolts and attach the DEC drive cord and the hand-paddle cord. Plug in the power cord and turn on the power switch. Attach the eyepiece adaptor to the telescope and insert an eyepiece. Please use the hand paddle when moving the Meade-10.

   c) The Celestron-14 essentially just needs to be turned on. Attach the eyepiece adaptor and insert an eyepiece. Your TA or the instructor will show you how to open up the small dome enclosure properly.

   Note that in each case the telescope’s RA drive only engages when the RA clutch is tight.

   Notice how the telescopes are mounted – take a few moments to examine the mount and make sure you understand why they are mounted this way.

2. Using the Finders

   a) Attach the Telrad finder to the special Telrad mount on the telescope. Aim the telescope at a bright star, and center it in the Telrad. If the star is not visible in the telescope with a low-power eyepiece (25 to 30 mm focal length), then scan the area until it becomes visible. You will also have to adjust the telescope’s focus. Adjust the three screws on the back of the Telrad to center the star in it.

   b) Often you will need to search for faint objects you cannot see in the Telrad. So, you should also mount the telescope’s finder. First, make sure the telescope is still pointed at a bright star; this will make it easier to align the finder. Adjust the screws on the finder to center the star in its field.
3. Counterweights and Hair Dryers (yes Hair Dryers!)

   a) For the Meade telescopes, you might need to add a counterweight on the front if you plan on attaching a heavy object (such as the photometer) in place of the eyepiece. You can add counterweights in segments. Find a counterweight and attach it to the telescope, then remove it so you know how this is done.

   b) On some nights, dew will start condensing on everything as the temperature drops. This is a problem especially for the glass corrector plate on the front of each telescope. The Celestron-14 has a heating element around the perimeter of the corrector plate; you just need to plug it into an electronic box specially built for it. For the other telescopes, you need to use the hair dryers.

4. Do Some Observing

   a) Pick out a few bright stars to look at through the telescope and to gain some practice in moving the telescope around. Try different eyepieces.

5. Try a Different Telescope

   a) After you’ve observed a few stars through the telescope you setup go and try working with a different type of telescope

   b) Note you’re welcome (and encouraged) to use different telescopes on different nights and for some term projects you’ll need to use the larger telescopes.

6. Closing Down the Telescopes

   Again the exact procedure will differ slightly for each telescope but essentially you will reverse the steps you used in setting up the telescope. For the pier mounted telescopes: Remove the eyepieces and adaptors. Remove the finders (make sure the Telrads are OFF). Turn off power and disconnect cords. Stow the telescope and put on covers. Loosen bolts and remove telescopes from the piers. Return all equipment to the main building. For the Celestron-14 the procedure is similar but of course you don’t remove the telescope – your TA/instructor will show you how properly close the dome.

For your lab report: Note the date and time of the lab session. The telescopes you used. Note any problems you had with the setup. Comment on how the telescopes are mounted – what’s the name of this type of mount and what’s the advantage to mounting telescopes this way? Finally be sure to note what objects you looked at with the telescopes.