

Rigel Observing Project Proposal

Note: You only need to turn in one proposal per group.

Names of Group Members:

Name of Object(s) (give astronomical name, i.e. M 33 or NGC 1501):

Type of Object (i.e. galaxy, nebula, star cluster, etc):

What is the RA and DEC of your object? Is your object visible by Rigel during November sometime between sunset and sunrise?

Dimension of Object (in arcminutes) (if you are doing an extended object (galaxy or nebula))

What do you plan to do (i.e. make a tri-color image, calculate expansion speed)? Include as much detail as you can. (Use the example projects as a guide for ideas.)

Information about Rigel, U Iowa's Robotic Telescope in Arizona

- **Rigel homepage:** <http://astro.physics.uiowa.edu/rigel/>
- **Observer's blog:** <http://astro.physics.uiowa.edu/astroblog/> .
- **Telescope information:** 0.37 m classical Cassegrain reflector, nine megapixel CCD camera, and seven position filter wheel (optical telescope)
- **Pixel Scale:** 1"/pixel
- **Field of View:** 25.5' x 25.5' (make sure that your object is at least around 10' big, otherwise it will appear very small in your image; also make sure it is smaller than 25' or it won't fit in one image)
- **There are 6 filters:**
 - L (clear)
 - R (red)
 - G (green)
 - B (blue)
 - H (Hydrogen Alpha)
 - O (Oxygen III)
- **Exposure times:** For stars and/or planets: use exposure calculator on the Rigel website. If you are observing galaxies or nebulae, don't necessarily trust the online calculator (which is best for stars). The best exposure times are 60 seconds for LRGB and at least 120 seconds for H and O. You might have to experiment to get the best exposure time.
- Once you have submitted your observation request, you can check its status by going to the Rigel homepage and clicking on Current Queue and then Submit
- If you are waiting on images, it would be a good idea to check the blog (link above) to see if there was an issue with your request. If there was a problem with your request, the telescope scheduler will not fix it. You will have to address the issue and then resubmit your image request.

Information on Submitting an Image Request to Rigel

- Go to the Rigel homepage and click on 'Observing'
- Go to section 3 and type in your observer code (lowercase with no spaces), make up a Project Title (maybe the name of your object) and enter in your name and your partner's name next to Observers
- In section 4 enter your object's astronomical name (like M 82 or NGC 2264, NOT it's common name, like Ring Nebula). If your object is not in Rigel's catalogue you will have to enter its RA and Dec and click on 'Manual'
- Click the boxes next to the filters you want and enter in the appropriate exposure time in seconds next to the filter. If you are doing stars or planets, use the 'Calculate Exposure' link.
- If your object is only visible early in the night then you might have to specify a Start LST time. If so, let me know and I will help you with this, but otherwise leave it blank.
- If you want multiple sets of images, you can set the Repeat Count and Delay. For example, if I want 3 sets of images at each filter taken every 15 minutes I would enter 3 in the first box and then 00:15:00. If I had the L,R,G,B,H, and O filter boxes checked then I would get 3 images of each filter (total of 18 images) back.

Example Rigel Research Projects

These are just a handful of ideas to get you started. Please feel free to consult with your TA for further ideas. Quantitative projects will be considered to be worth more credit than qualitative (purely imaging) projects.

Galactic Objects

Stars and Stellar Clusters

- (1) BV Photometry to measure magnitudes and colors for members of a stellar cluster
- (2) Imaging of a White Dwarf – ie. 40 Eridani; could get size
- (3) RR Lyrae stars – have periods of hours; could get lightcurve in one night of observations!
- (4) δ Cephei – one of the classical Cepheid variables; has period of one week
- (5) Eclipsing binary system: make a light curve to determine the period and then use a simulation (Binary Maker) to determine properties of the two stars.

Nebulae

- (1) Imaging of a Planetary Nebula or Supernova Remnant: tri color imaging and measure size, age and/or expansion speed
- (2) Imaging of a Planetary Nebula and WD system and get absolute magnitude of WD in the center
- (3) Emission or Reflection nebula: three color image and determine size, volume, mass, number of solar mass stars
- (4) Emission or Reflection nebula: two color imaging with H and O filters and get chemical abundance

Galaxies and Extragalactic Sources

- (1) Imaging and color of a galaxy
- (2) Imaging of a galaxy in the H filter to study star formation regions – size and location within a galaxy
- (3) Supernova search