AST 2134: OBSERVATIONAL LAB 2 **PROBLEM SET 2/5** **SPRING 2017**

NAME: _____ **DATE:** _____

Download the m53raw`.tgz` *tarball from the course webpage onto your computer. Unpack it using* `tar xvzf m53raw.tgz`. *Then answer the following questions.*

1. Determine the contents of every image by running the usual diagnostic tools. Check image sizes in pixels, exposure times, object types, coordinates, etc. Recap what you learned.

2. You probably noticed that dark frames are missing. Based on the image statistics, make an argument why darks may not be necessary.

3. Display an image file (tweak stdimage if necessary). What is the range of pixels (x and y) in the overscan region? What is the range of pixels (x and y) that contain useful data?

4. Using `implot`, determine the median, mean and rms of the overscan region.

5. Now that you are convinced that the overscan bias is very non-linear, how would you go about removing it? Only discuss it, do not actually do it.

6. We will not be fixing the bias using the overscan region; instead, we will use our bias exposures. Why is that a better option?

7. To set up `ccdproc`, you needed to tweak other header keywords. List all of them here, and how you tweaked them.

8. Running `zerocombine`, we have a choice of using the average or the median for combining images; which one is more suitable and why?

9. Take a closer look at the master bias image; does it make sense what you see? What did we achieve by combining several bias fields? (hint: use `imstat` to make a strong argument).

10. After running `ccdproc`, display the bias-corrected object image and comment on what you see.

11. Running `flatcombine`, we have a choice of using the average or the median for combining images; which one is more suitable and why?

12. Running `cosmicrays` can be dangerous in crowded fields; why? Is that problem present in these images?