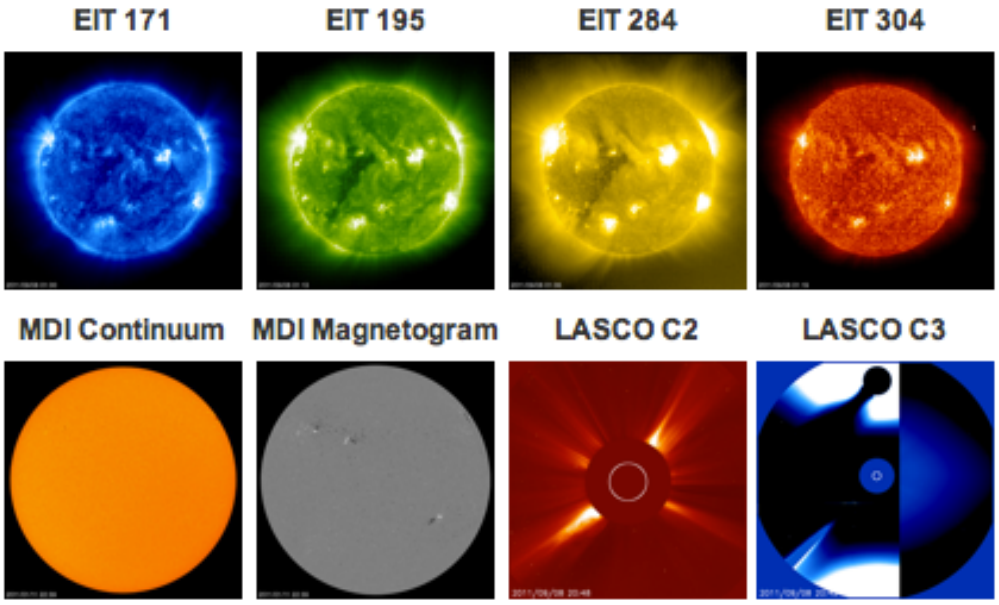
AST101IN Spring, 2012 Follette Name:_____

Solar Observing Lab

1. Go to www.thesuntoday.org and click on "The Sun Now" in the menu. You should see a block of images from the SOHO telescope that looks like this.



These are eight different images of the sun taken at eight different wavelengths (colors) of light.

(a) Click on "MDI continuum" on the bottom left to enlarge the image. Sketch what you see on a sheet of white paper. Use ~1/2 a page for each sketch and do them carefully– you'll make 4 of these sketches total, which should easily fill the front and back of one white sheet of paper. Try to represent the relative size and shape of ay features you see as accurately as possible. Label your drawing "continuum" which is essentially another name for "white light"

(b) Click on "EIT304" on the upper right and sketch this as well. Label this one "H-alpha". This is the sun as seen in a very narrow range of colors centered around a wavelength of 656 nanometers (nano is billionths!), which is where the element Hydrogen emits much of its light. Next to your drawing, describe how this image is different from the last (Do you see more or less detail? Do you see different types of features?).

(c) Scroll down to the next block of images (images from the SDO telescope) and click on the "HMI Magnetogram" image. This shows a magnetic image of the sun in black and white, with each color representing a specific magnetic polarity (like

the north and south poles of a bar magnet)[1]. Sketch what you see and label it "Magnetogram".

(d) Now, go outside with the eclipse glasses that you were given in class and sketch the sun as you see it. DO NOT LOOK AT THE SUN WITHOUT YOUR ECLIPSE GLASSES ON!!!

(e) There is a telescope set up outside with a special filter on it. You should also sketch the sun as it appears through the telescope.

When you have completed all of your observations, you should answer the following questions.

1. Telescope filters can do two things. They can block a certain percentage of the incoming light, or they can let in only certain colors of light, or both. Which type do you think we used here and why?
2. Which of your images (a)-(c) is most similar to the sun as you saw it through the eclipse glasses? Why?
3. The images that you saw of the sun might have different orientations depending on whether you were looking at them on the computer, with the eclipse glasses or through the telescope. Study the features that you saw on the surface in each and determine which way is "up" for each of them. Label the "up" direction on each image (the sun is a sphere so "up" is fairly meaningless here – just be consistent between your images).
4. Beginning with the continuum image, label each visible feature or group of features with a letter (A, B, C, D, etc). For each of your other drawings, label features that appear at those same locations with the same letters (remember to use "up" as a reference). If there are any new features in the other images that aren't visible in the continuum image, give them a new letter.
5. For each of the letters you used for solar features, write a 1 sentence statement describing the feature (Which images does it appear in? Is it the same size in all images? Is its shape the same from image to image?).
6.
    a. Did you see any sunspots? If so, did they appear in all of the images?
    b. In which image(s) were they most prominent?
    c. Based on what you know about the sun (what drives activity, where most of the light escapes), why do you think this is?

[1] You may note that the SOHO telescope also includes a magnetogram, but this is not updated as frequently as the SDO version, so it's difficult to match up features with the other images.