

Sky Brightness Observations

Direct Access:

If you have an account at NCSA you can access the data directly with "ssh"

```
ssh **username**@lsst-dev.ncsa.illinois.edu
```

```
cd /nfs/lsst/all-sky
```

Here you will find a directory for each night that data from the all sky camera were collected.

*** I still need to put a pointer for the diode data ***

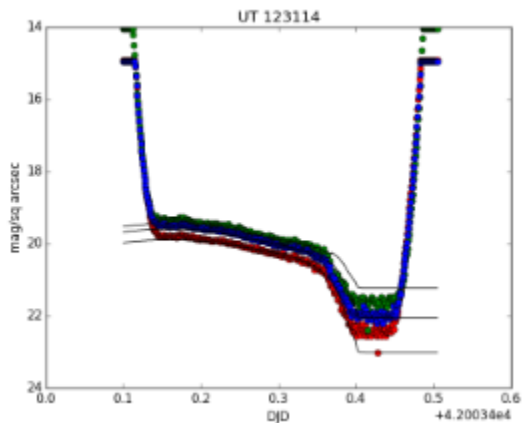
Web Access:

<http://lsst-web.ncsa.illinois.edu/all-sky/>

You can use "wget" to retrieve specific files or directories

```
wget -r -e robots=off http://lsst-web.ncsa.illinois.edu/all-sky/**file or directory name here***
```

Comparing to the ESO Sky Brightness Calculator:



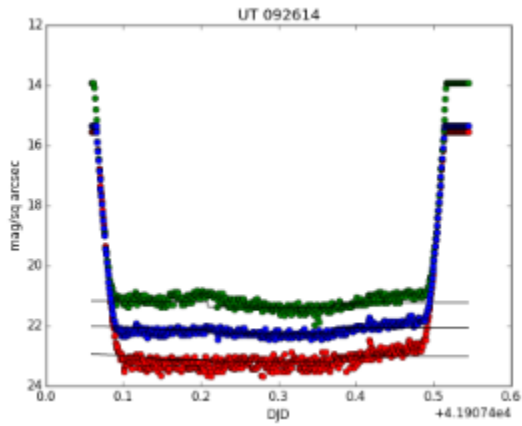
Here's the sky surface brightness at zenith in the three Cannon filters, along with the ESO model in black lines. This is a cloudless night where the moon sets near the end of the night. The ESO model is shifted to match the observations in the middle of the night. In the blue, the model and data look pretty good, but in the red the model predicts a much fainter floor once the moon sets, and a brighter floor in the green. I think this means the ESO model is doing a good job with the relative changes of the moon, but the relative brightnesses of different night sky components are not well matched (or are not properly matched for our site).

Q from Lynne: are you generating the broadband mag in the cannon filters by taking the ESO sed & then calculating the mag in those filters? I'm trying to think if looking at color vs. mag plots would be useful in addition .. could plot ESO points X's and observed points O's ? Same basic information, but maybe focuses on the color a bit more.

A from Peter: For these I was just comparing ESO's magnitudes in astronomical filters to the similar Canon filters. I just got the Canon throughput curves, so I'll switch to using the SEDs and doing proper mag calculations.

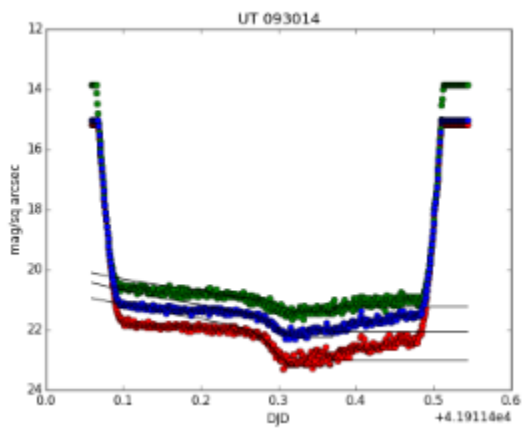
NOTE: Plots below here were produced from photometry that had bugs. (how does the bug in the photometry affect your conclusions at the bottom of the page about sky brightness near the moon?)

I use the [eso sky calculator](#) to compute the expected surface brightness for each time on the given days. Note these calculations were made for zenith (airmass = 1), and I turned the zodiacal light off for the time being (still need to do some coordinate conversion to calc zodiacal light properly). I'm assuming the Cannon RGB filters map to astronomical R, V, B via a zeropoint shift (e.g., I take $-2.5 \log_{10}$ of the skybrightness measurements and add a zeropoint to match the median of the model in the middle of the night).



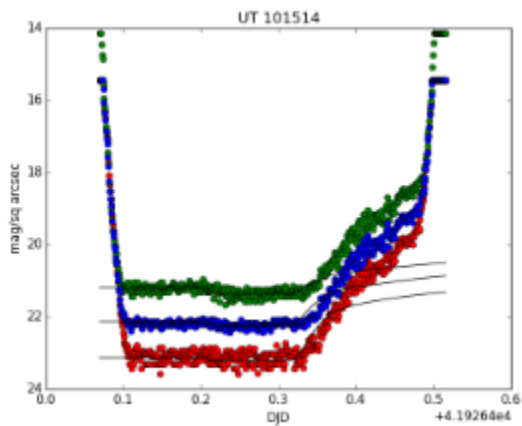
the data look pretty constant.

A nice dark night. The model says the sky brightness should be pretty constant and

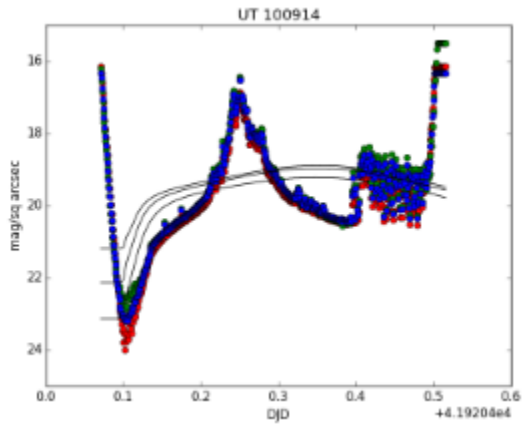


brighter at the start of the night.

Moon starts up and sets during the night. The model predicts the sky should be



Moon rises during the night. Model seems to get the first part of the rise pretty well, but then the sky gets much brighter than the model. --there are actually some thick clods that roll in at the end of the night that could explain this one.



Nearly full moon rising at the start of the night (as full moons tend to do). Those are clouds hitting at the end of the night, but I'm not sure why the measured brightness goes to such a monster peak in the middle of the night.

Preliminary thoughts:

- Running the ESO calculator over the web is really slow and painful
- The ESO model doesn't include twilight at all!
- Looks like there is an issue with the sky brightness measurements once the moon gets above a certain elevation. OR, the ESO model fails if it gets too close to the moon. I'm going back and forth on who to blame this on. Need to run an experiment with the ESO model to make sure getting closer to the moon keep making things brighter correctly.
- Looking at the movies, looks like we get plenty of contrails to the west.