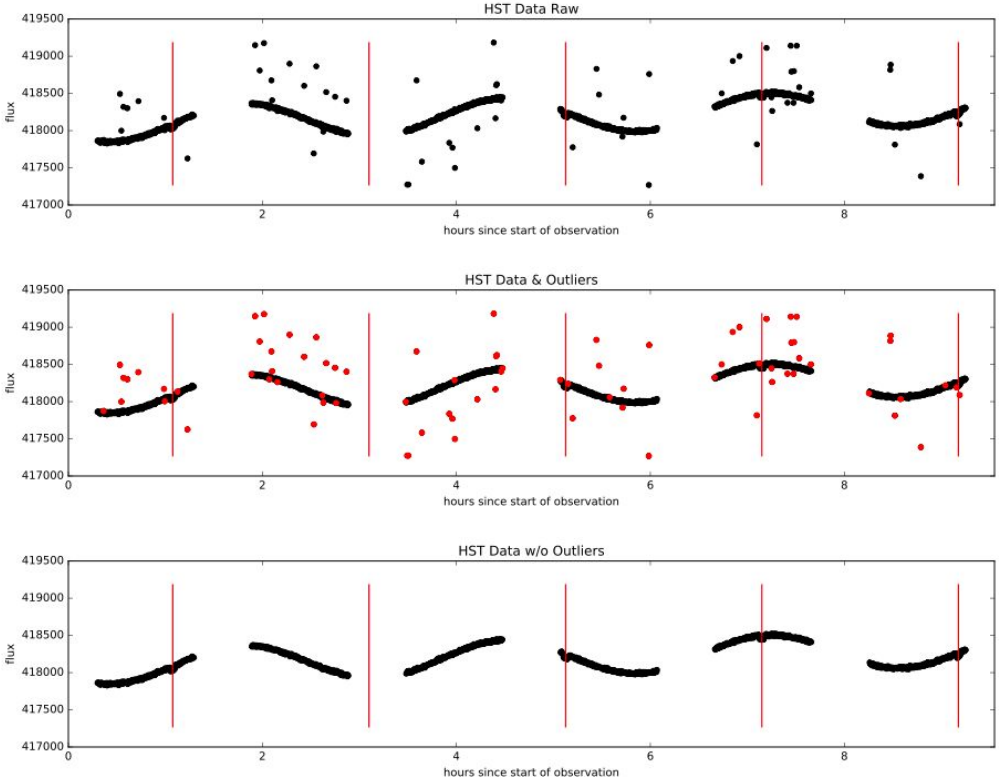
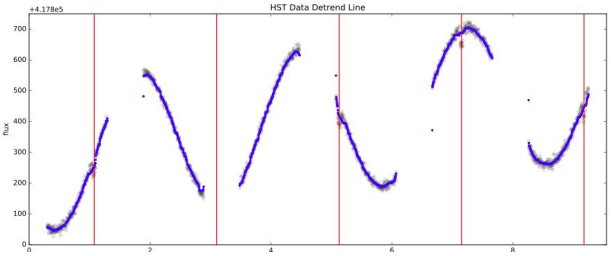
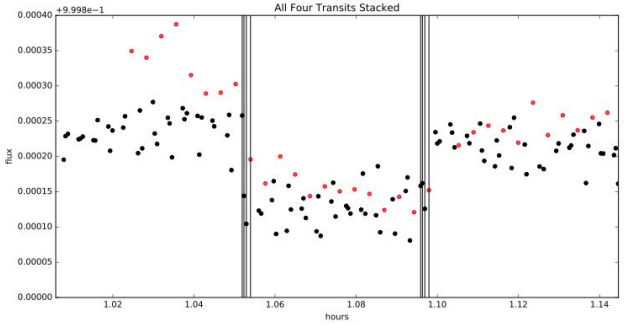
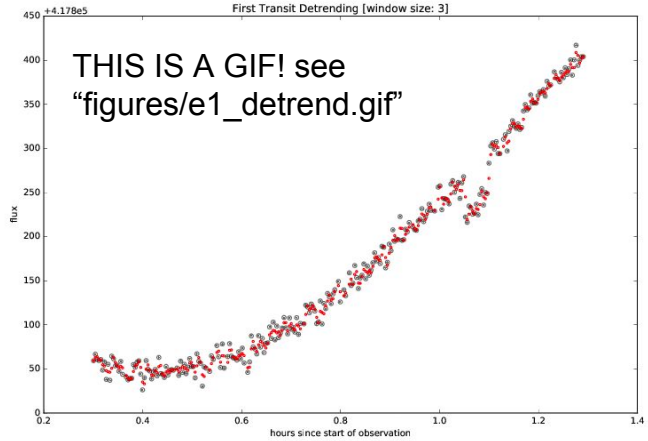
Astrostat Lab3: HST Data Detrending



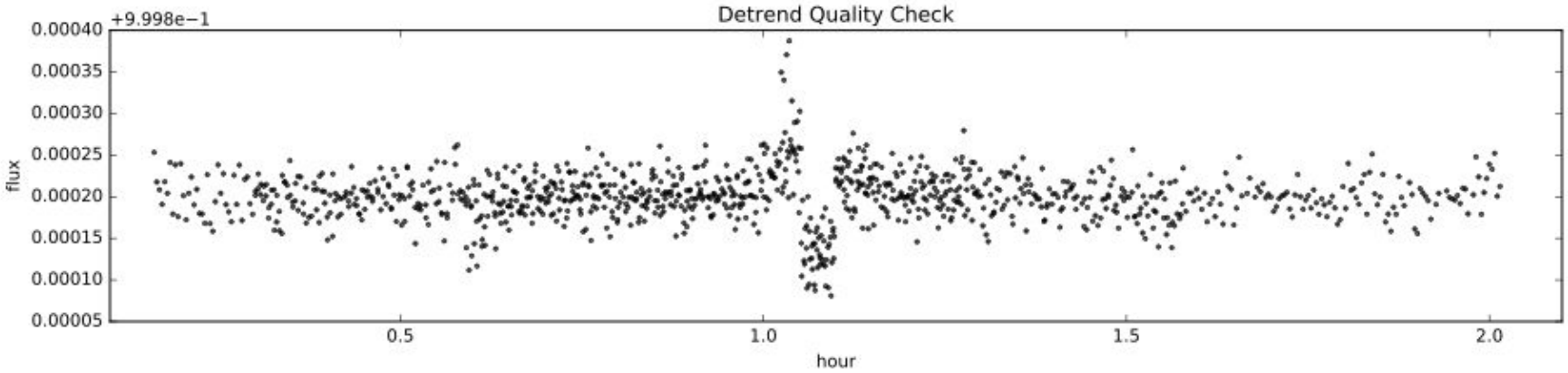
- We want to find transits in the HST data
- Noisy HST data due to heating/cooling by the Sun, HST's orbital period, pixel defects, cosmic rays, & many other factors!
- To find the transits we need to remove the outliers (cosmic rays & pixel defects) AND overall trends (detector heating etc.)
- Outlier detection done by moving median of window = 7 (~ half size of the transit) and a cut at 3 sigma
- 4.7% of the data removed as outliers







- Used larger window for overall detrending of the HST data
- Split the four transits and added stacked them to get depth
    - Second and fourth transit detrending affected by how close they are to the edge of an observation period we’re approaching the limits of using moving median smoothing here!
- Larger windows for smoothing aren’t necessarily better (see gif)
- The transit causes a 0.0065% +- 0.003% decrease in the total flux



- Detrending overall pretty good: with exceptions around the edges of the observation periods where moving median fails
- Overall weighted residuals appears to be normal