Linearizing the Clio Detector

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Abstract:

Clio is the infrared camera of the Magellan Telescope's Adaptive Optics instrument. The Clio detector records light levels, but as those increase, the camera response isn't linear. I measured the nonlinear response of the Clio detector and determined how to correct this. I obtained Clio images where the exposure time was gradually increased. I read in every image's exposure and brightness count, and devised a way to correct the images by linearization through an equation. With the coefficients generated, I calibrated other data as well. My accomplishments revolved around learning Python and seeing how coding was applied in a scientific setting. I also learned about the process of data collecting and how that relates to work beyond my undergraduate career. Since the data set is now calibrated, we can fix more data from Clio, and use that to accurately measure the brightness of other stars and exoplanets found.