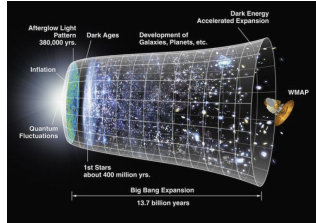


# Simons Observatory Large Aperture Telescope Receiver

Alexandra Weinsten with PI Prof. Mark Devlin



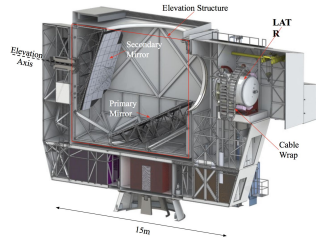
## Cosmology and the CMB:



Current cosmological model for the universe (NASA/WMAP)

- Cosmic microwave background formed around 380,000 years after the big bang
- The relic radiation
- Furthest light in the universe we can see (though it is not optical light)

## Simons Observatory:



Cross-sectional of the large aperture telescope (LAT)

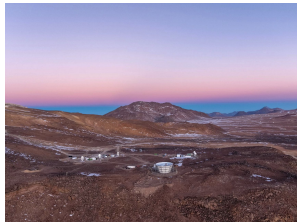


Image of the SO site on Cerro Toco

- CMB telescope
- Deployed in the Atacama Desert, Chile
- One six meter telescope and 3 smaller aperture telescopes.
- Unrivaled sensitivity by drastically increasing the number of detectors used in previous CMB telescopes
- Science goals: understand the physics of the very early universe, the nature of dark energy and dark matter, the properties of neutrinos, and the formation of structures in the universe

## SO at UPenn:



The LATR at UPenn

- Large Aperture Telescope Receiver (LATR) is being integrated and tested at UPenn

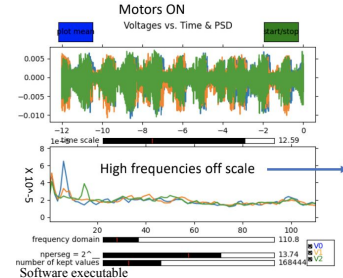


The LATR summer 2021 team at UPenn

## Vibrations Analysis for LAT and LATR:



Spectrum analyzer and LabJack



- Detectors need to be kept at 100 mK
- Any vibrations will cause heat
- Important we can analyze the vibrations
- Started with the big network analyzer
- Worked with Jeff Iuliano to write software to accompany the LabJack to accomplish the same FFT analysis
- Hook it up to an accelerometer to take the data
- Livestreamed the vibrations signals and their FFT's
- More compact/portable and can be shared
- Example of the software's executable
- The livestream of the vibrations and their accompanying FFT
- This data was taken in Germany by Prof. Devlin while he tested the LAT's motors

## Acknowledgement:

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