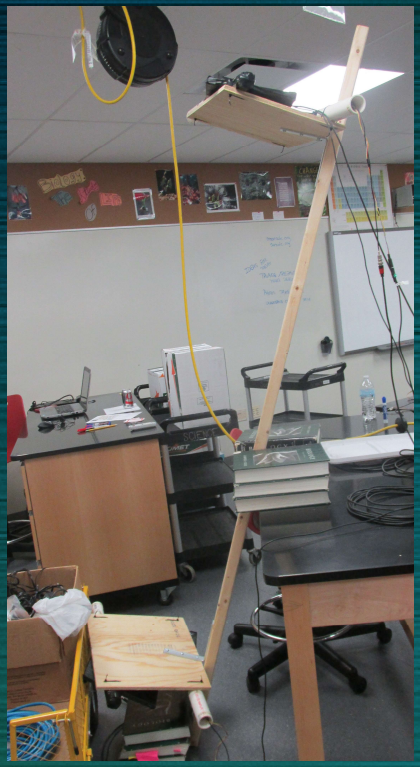
# Baseline Studies for Cosmic Ray Solar Eclipse Experiment



CH04
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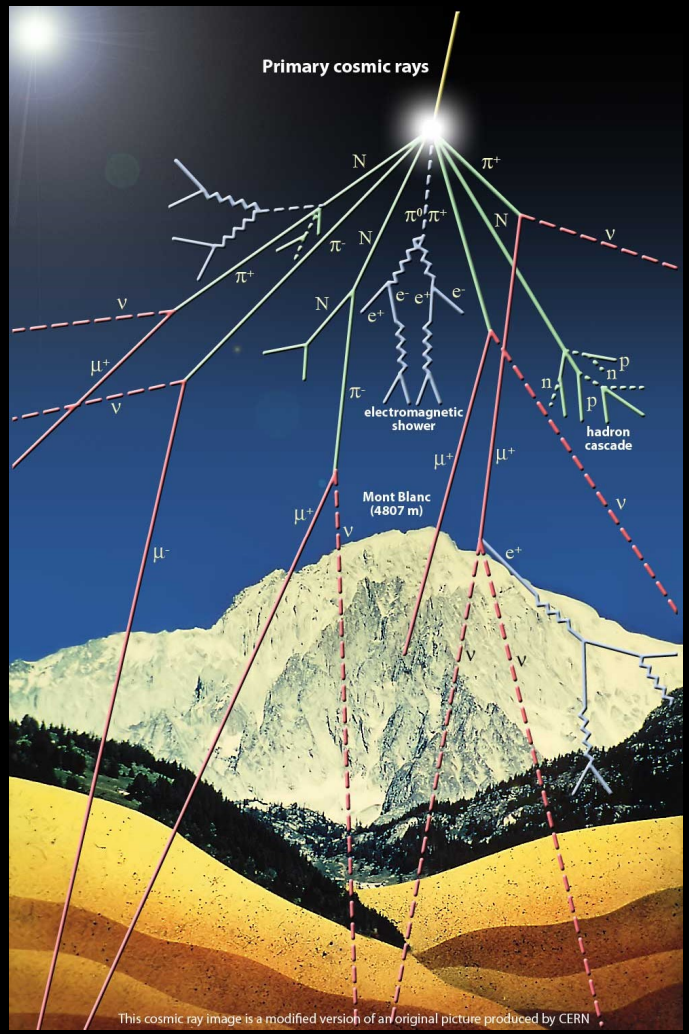
# Motivation

- Is muon flux affected by a solar eclipse?

# Hypothesis

- The cosmic ray muon flux rate will change during a total solar eclipse




http://www.science20.com/quantum_diaries_survivor/highestenergy_cosmic_rays_auger

# Purpose

- Collect data to create baseline for **comparison** to eclipse data

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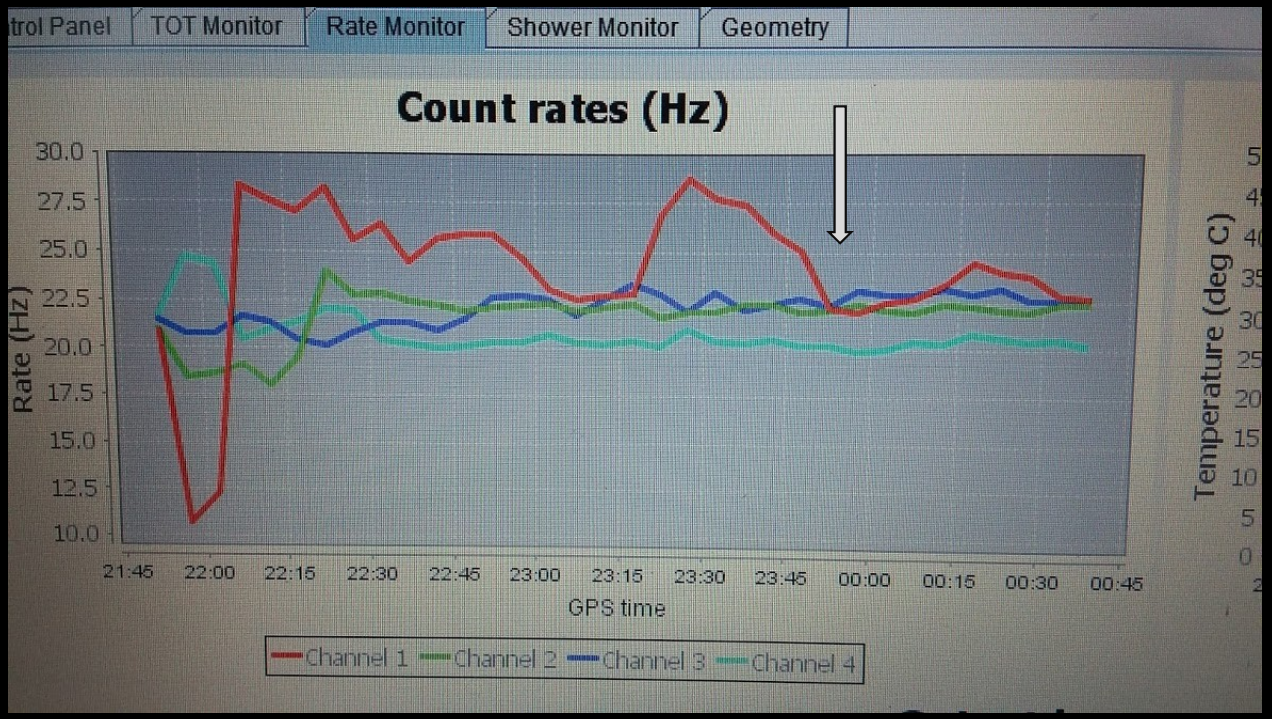
# Procedure

- Four telescopes
- Different geometries
- Various coincidence levels → normalization
- Flux changes with angle → $\sin^2\theta$ of elevation angle

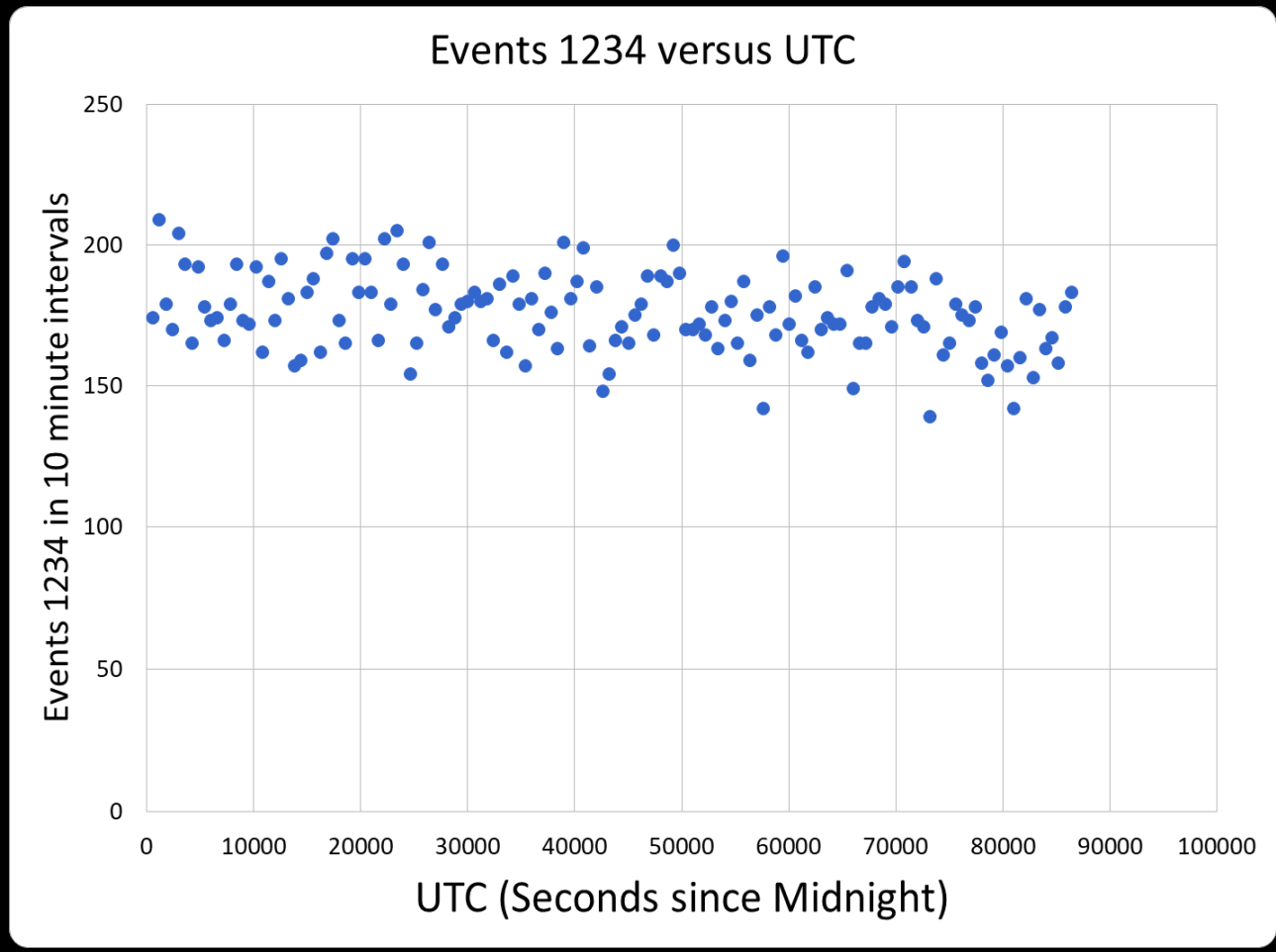
# Calibration

- Plateaued voltages
- Since different telescopes were used, false signals are detectable
- Practical preparation



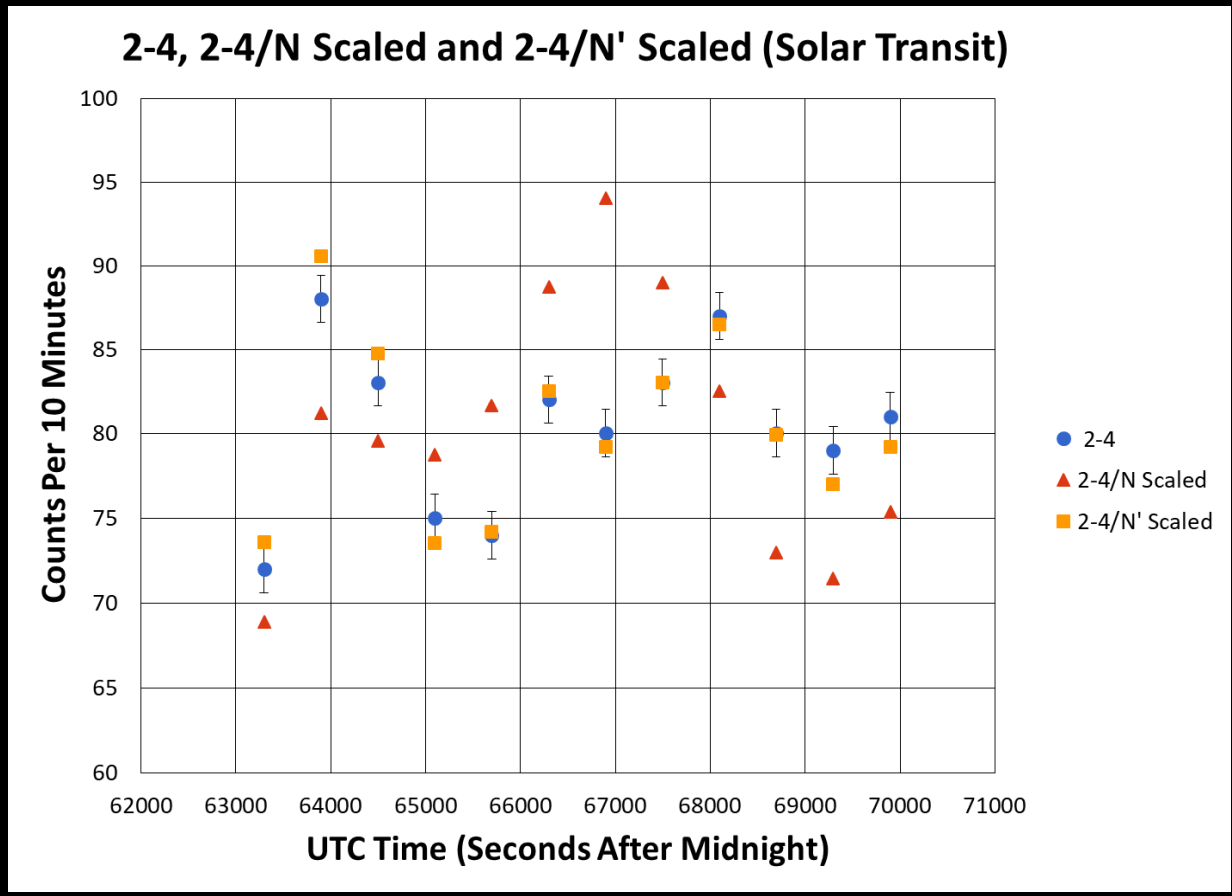
# Stacked

- Sky zenith
- Baseline for other detectors
- How frequently muons hit all counters; narrow window



# Fixed

- Fixed at ~63.5 degrees
- Sun's position mid-eclipse
- Counts stayed relatively constant – also in lunar and empty

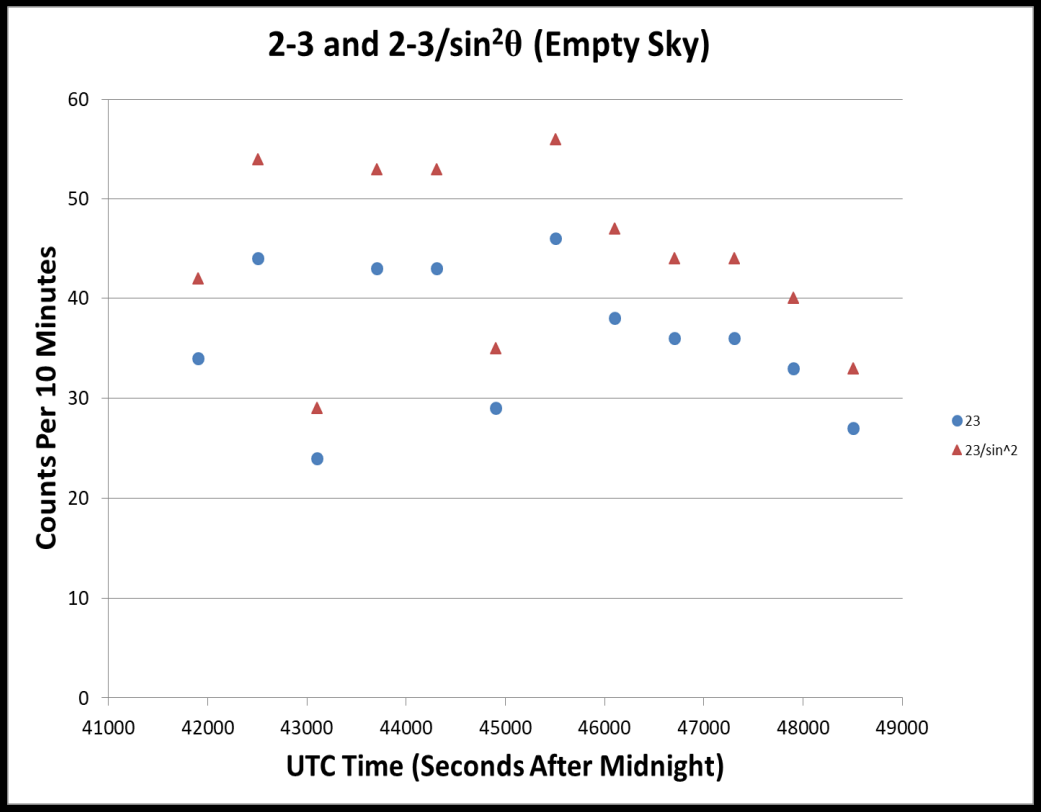


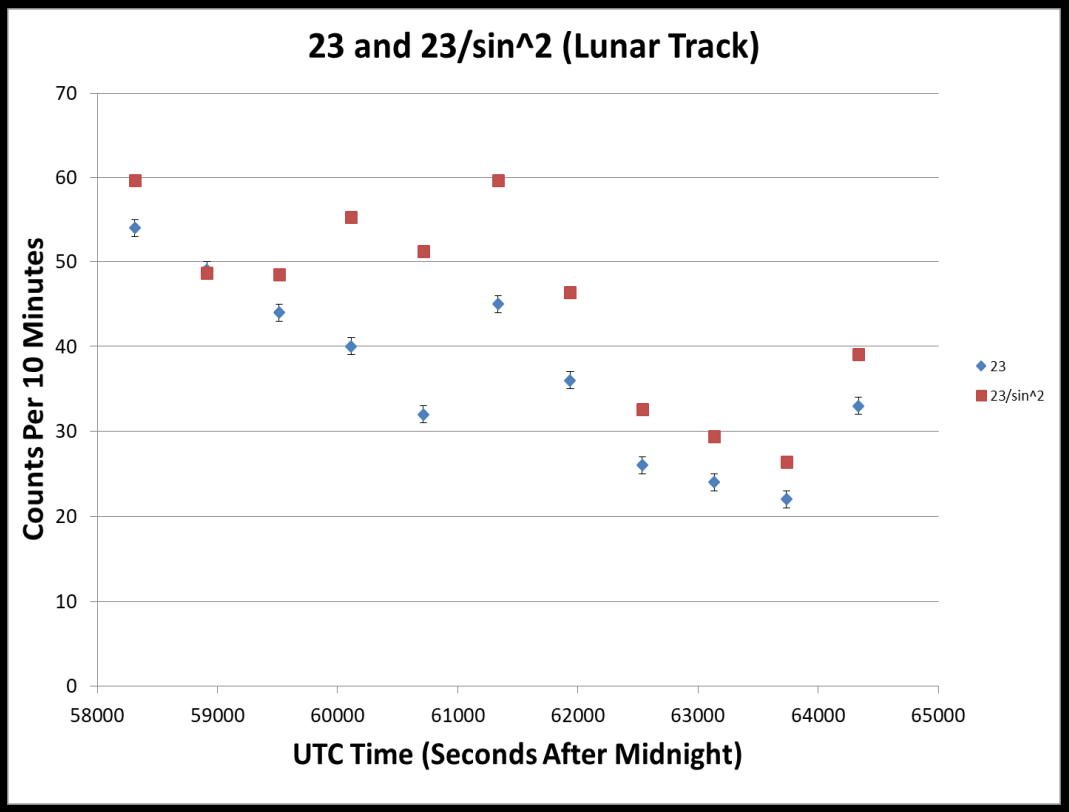
# Tracking

- Two trackers
- N-S, E-W
- Would see if any differences due to Earth's magnetic field during eclipse

# Tracking Graphs

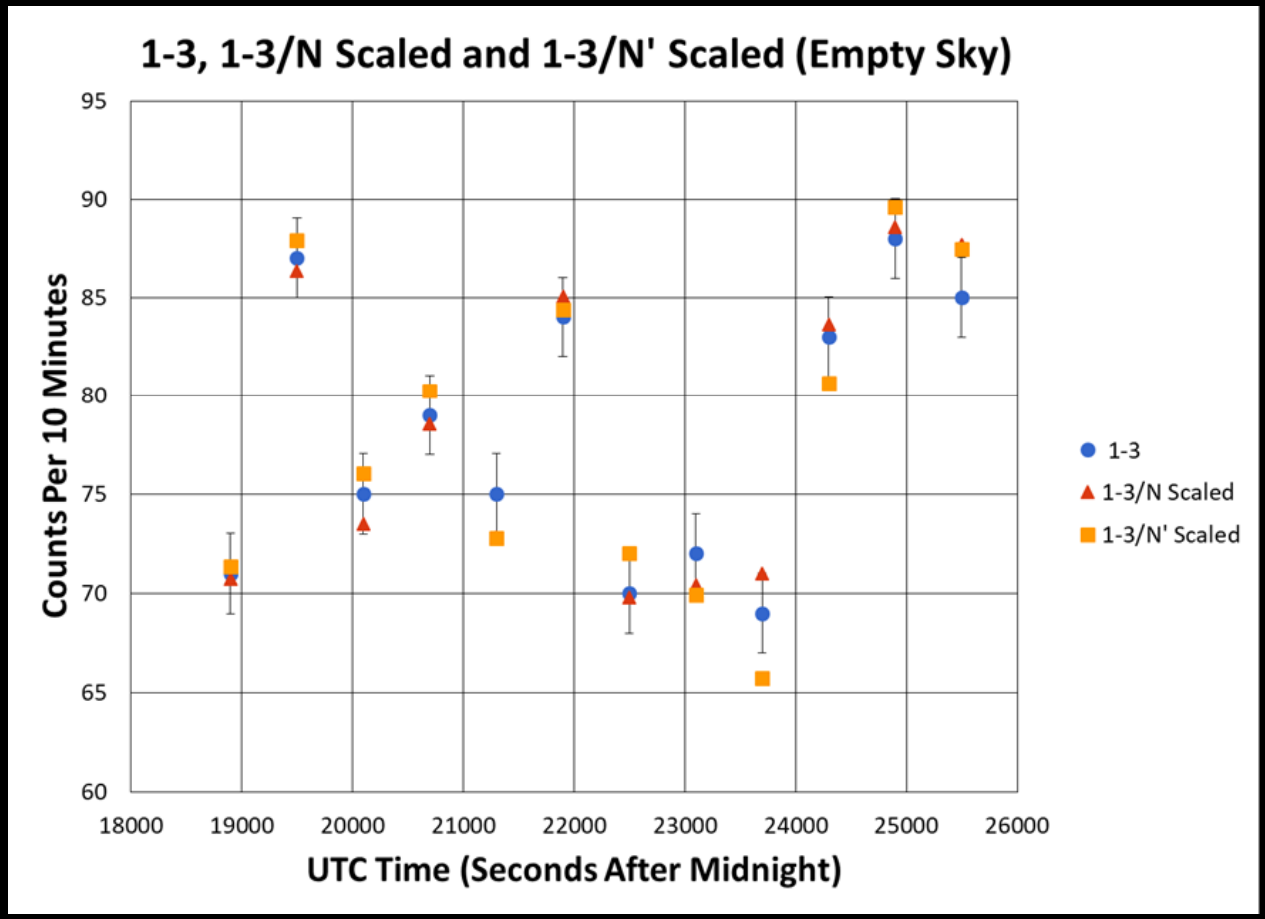
- Similar results



# Example Graph

- Fixed
- Normalization, internal and with stack, did not matter



# Conclusion

- Preliminary data and muon flux remained constant during baseline studies

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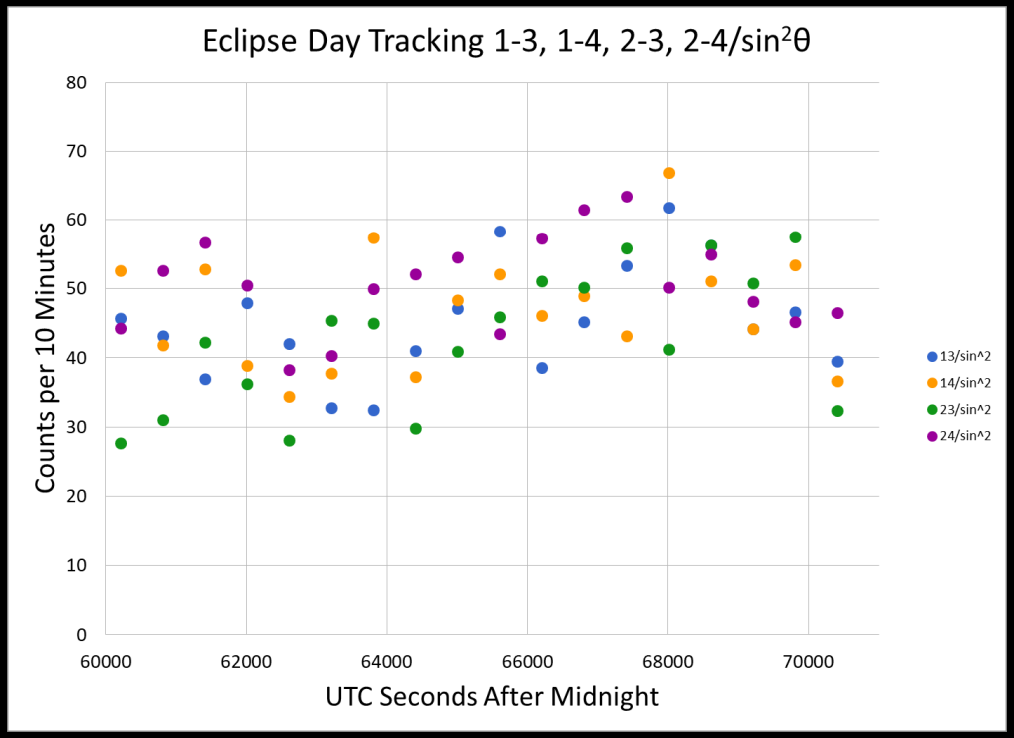
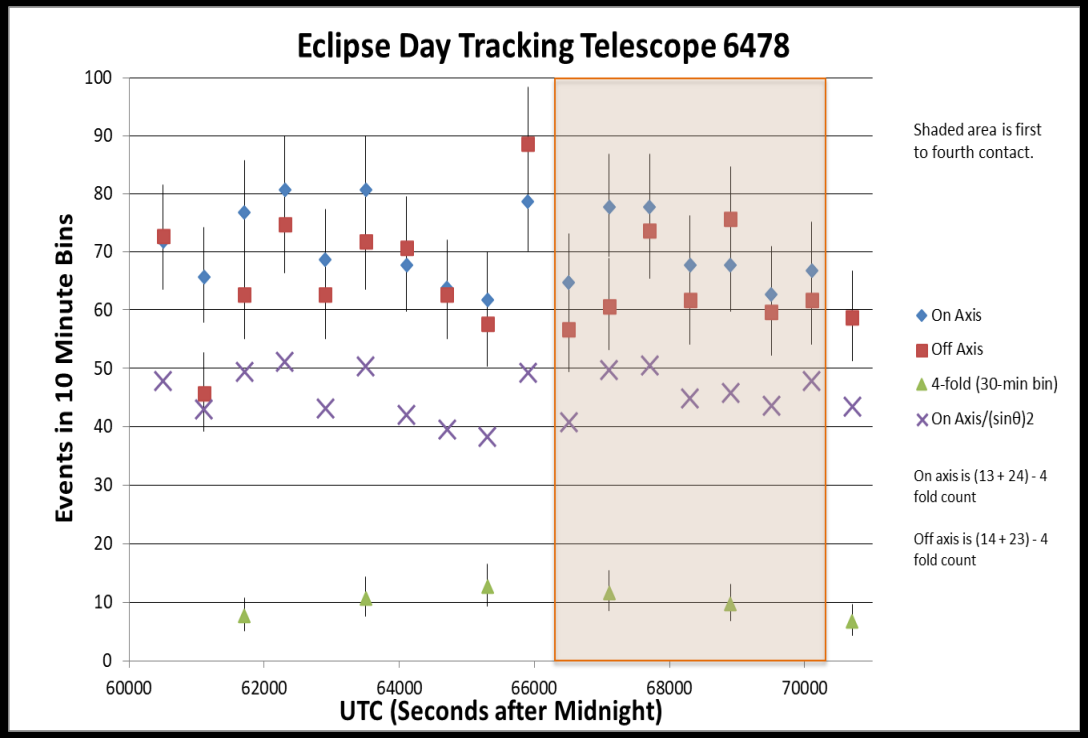
# Brief Comparison



# Acknowledgements


- QuarkNet, the National Science Foundation, and the US Department of Energy

- Team members Clarissa Carr, Tamar Dallal, Masha Matten, Jacob Rosenberg, Allen Sears, Jill Serling, Tony Valsamis, and David Wang

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