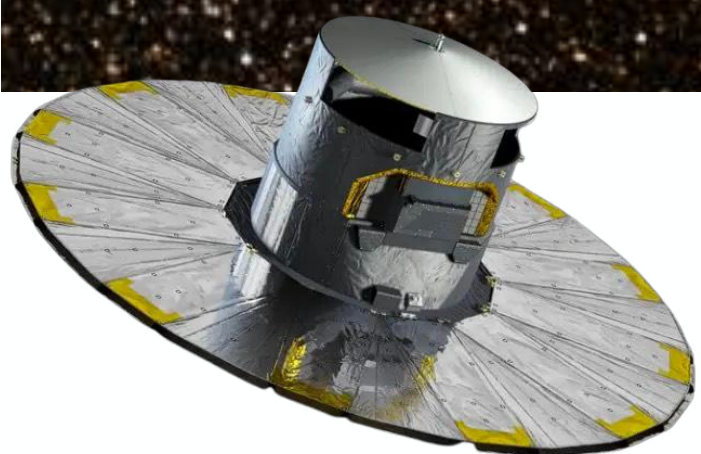
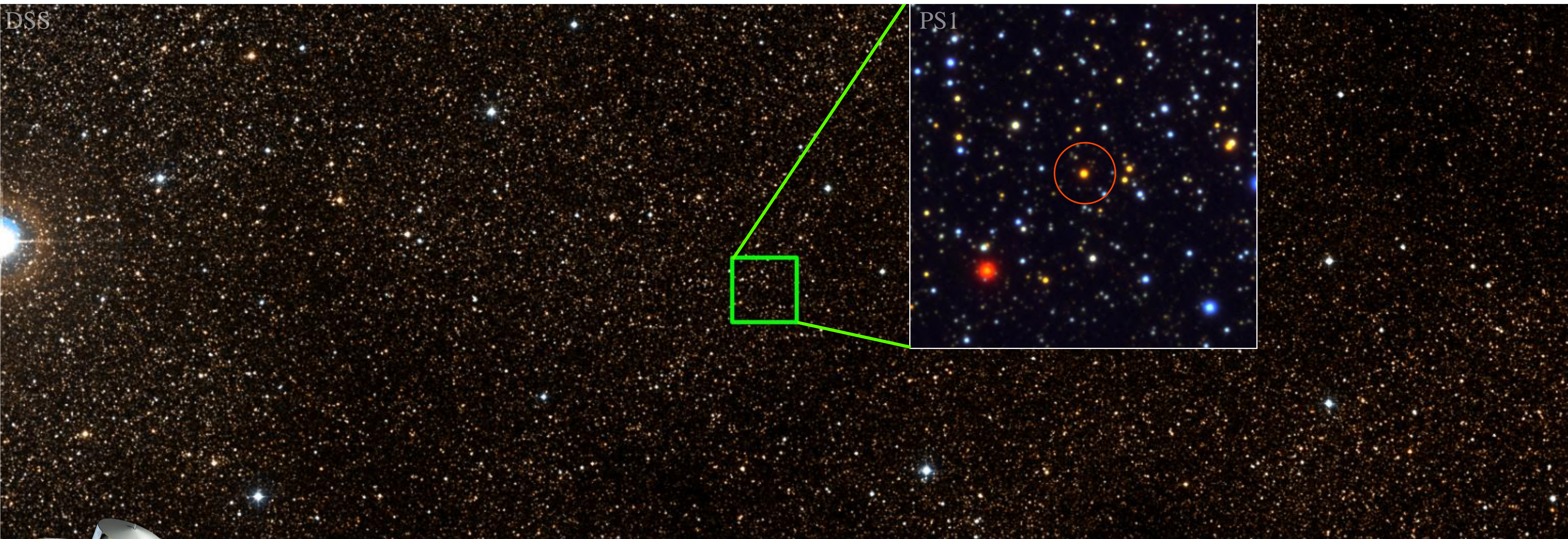


Discovery of the Deepest and Known Giant Blinking Star: Gaia17bpp

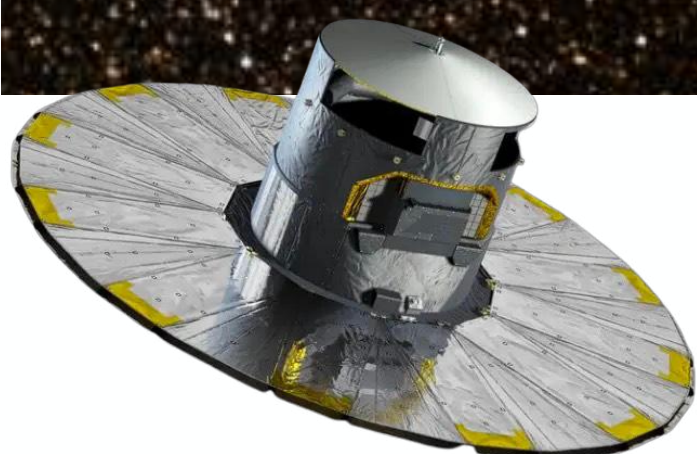
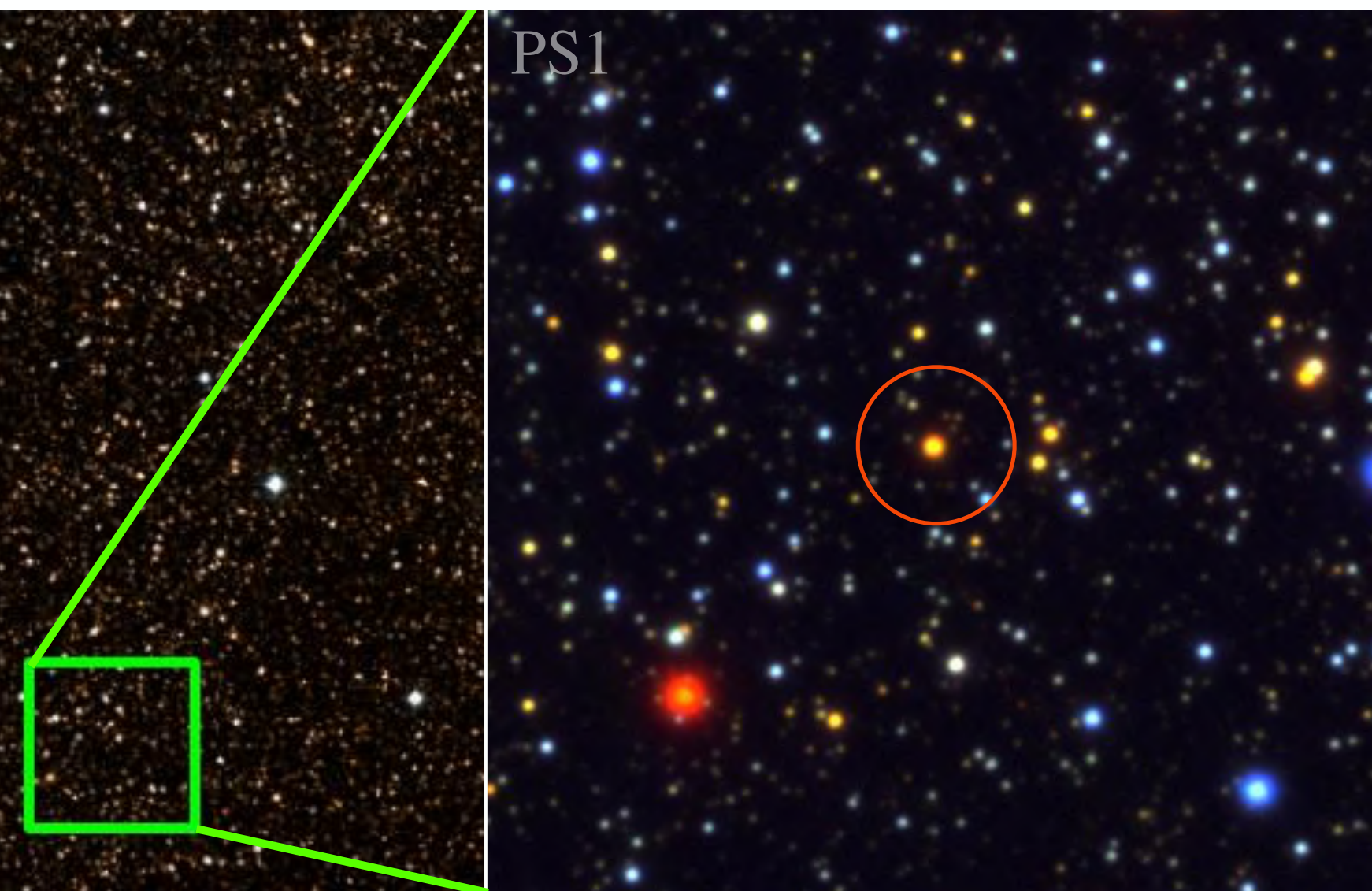
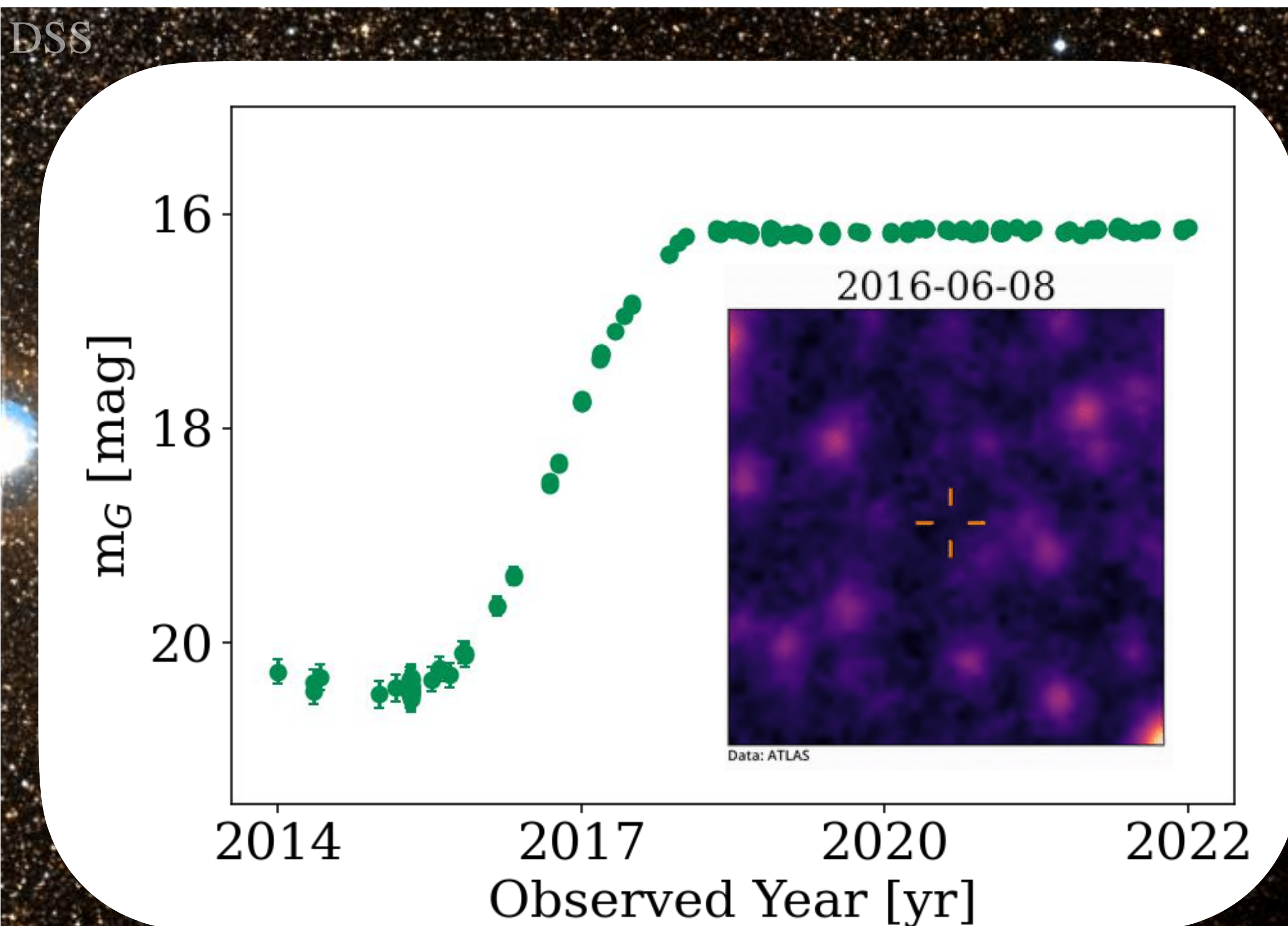
Anastasios (Andy) Tzanidakis, Dr. James Davenport,
Dr. Eric Bellm and Collaborators
atzanida@uw.edu \ atzanida.github.io



*Gaia*17bpp: A New Record Holder of a Giant Blinking Star

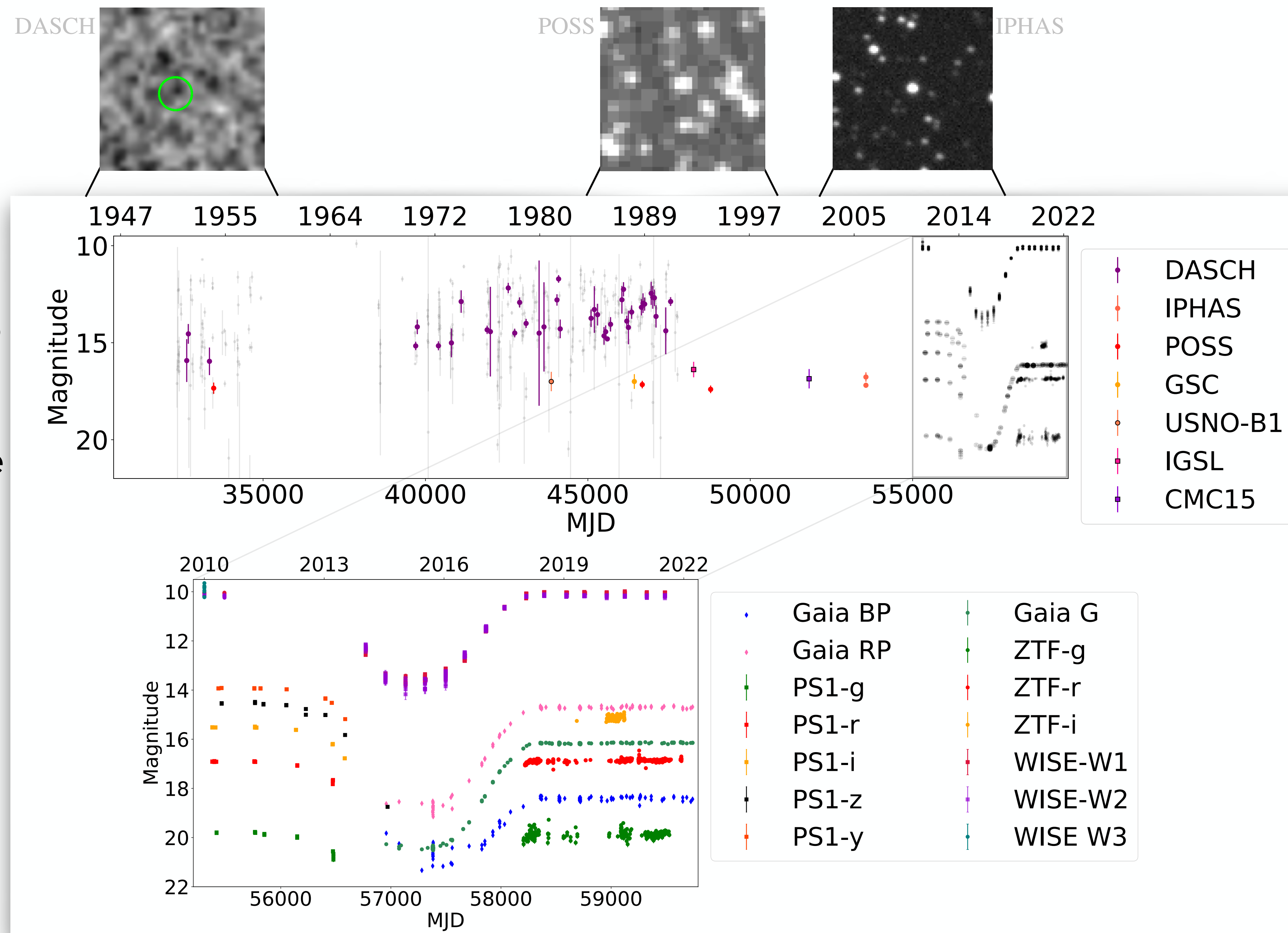


Gaia17bpp: A New Record Holder of a Giant Blinking Star



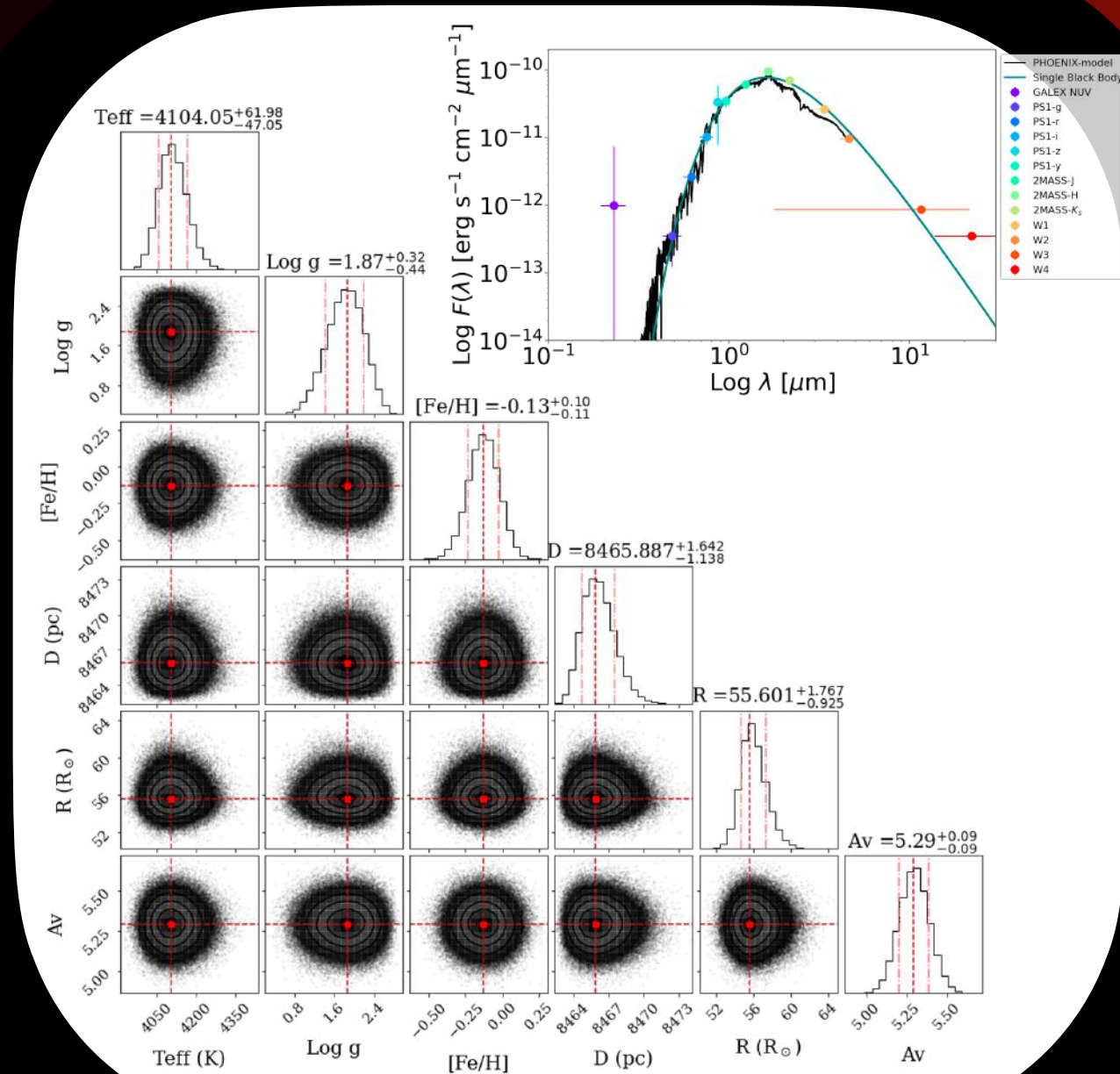
Over 66 years with no significant dimming events

- Archival data taken from >11 telescopes around the world to create a 72-year long mosaic light curve
- Oldest detections from the **Digital Access to a Sky Century @ Harvard** (DASCH) dating back to the 1950s

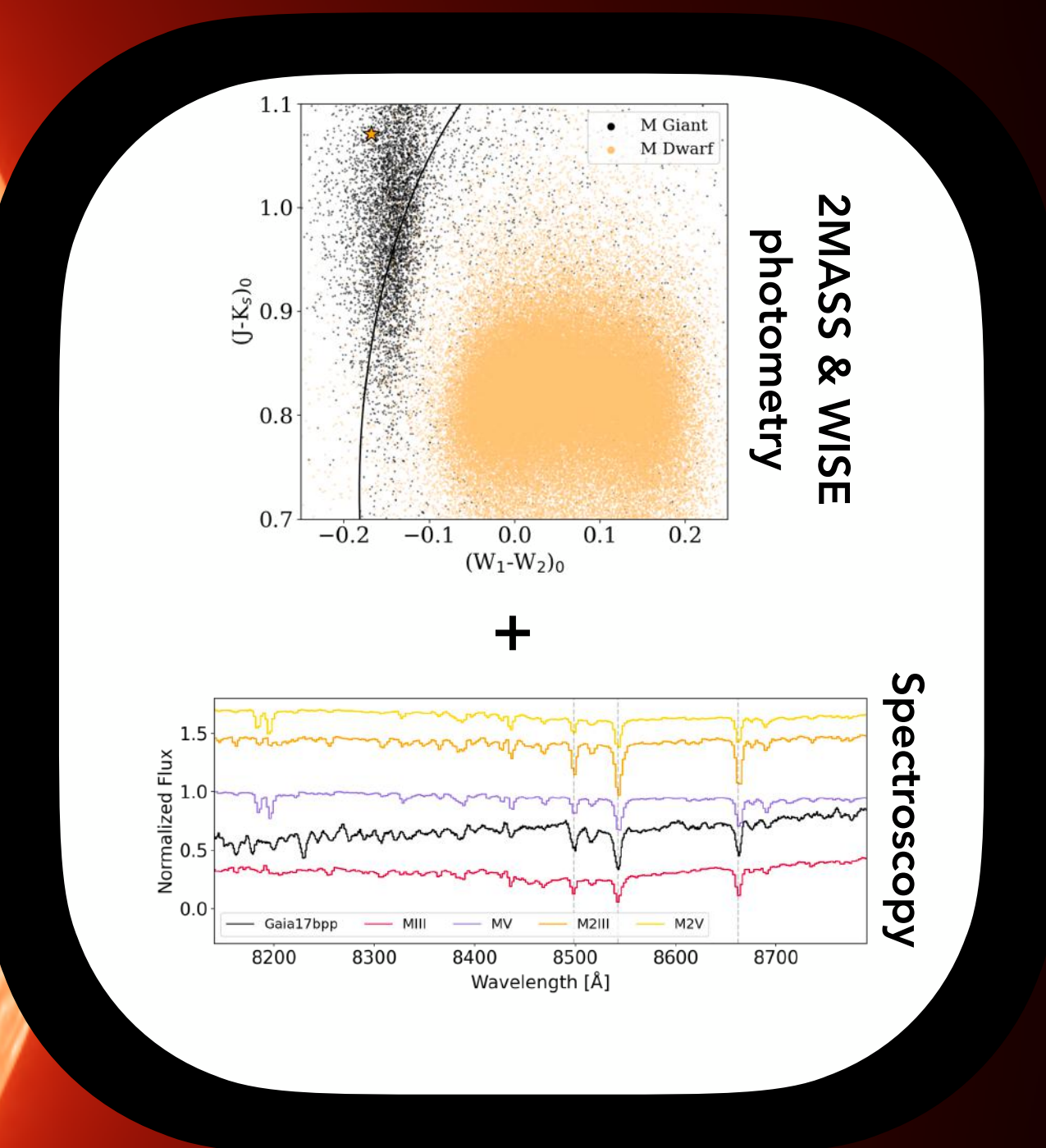


Physical Parameters of the Primary Star

SED/Isochrone Modeling

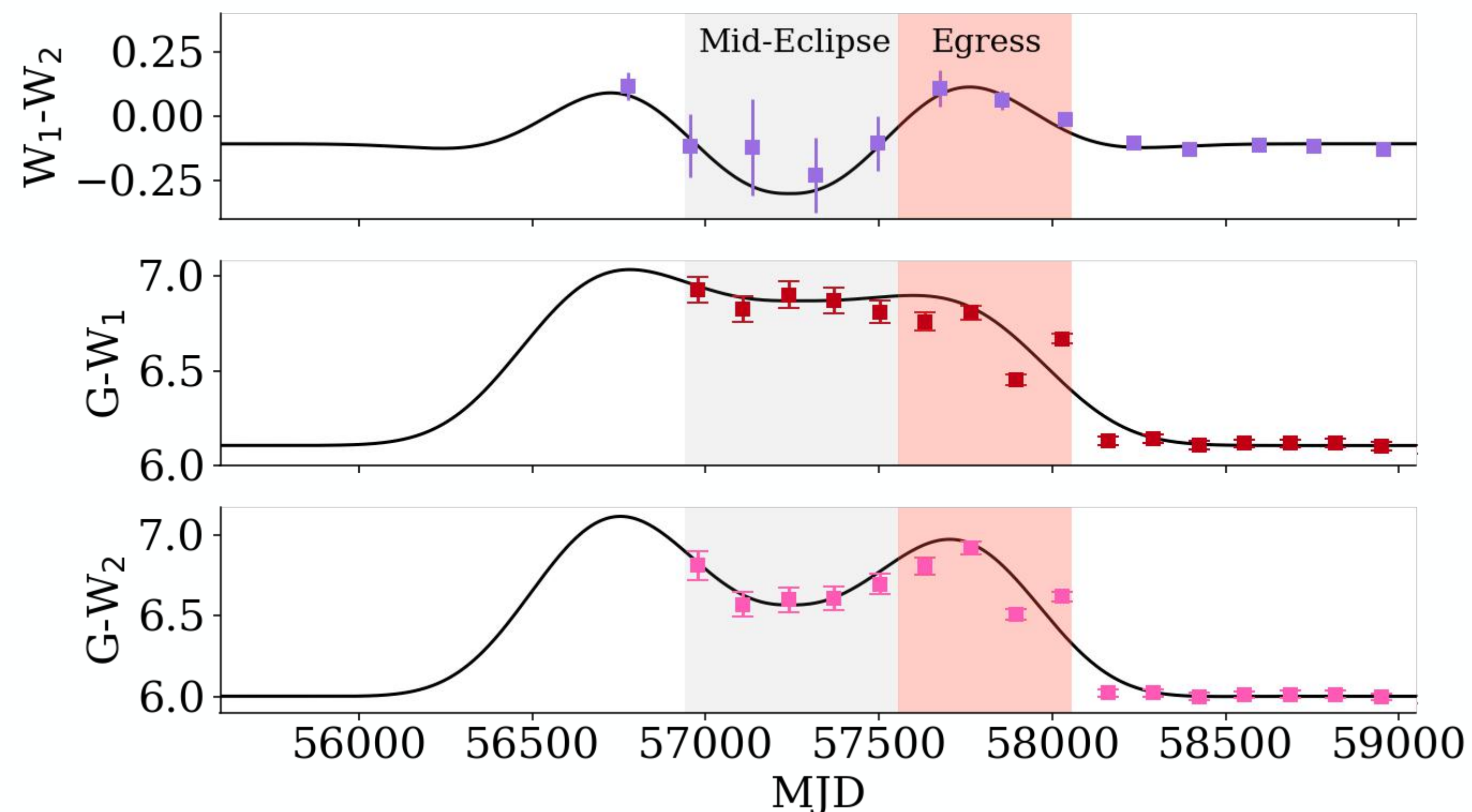


Spectro-Photometric Modeling



Conclusion: Giant M3-III, 4100 K, 55 R_{\odot} , 1.2 M_{\odot} , and roughly 8 billion years old

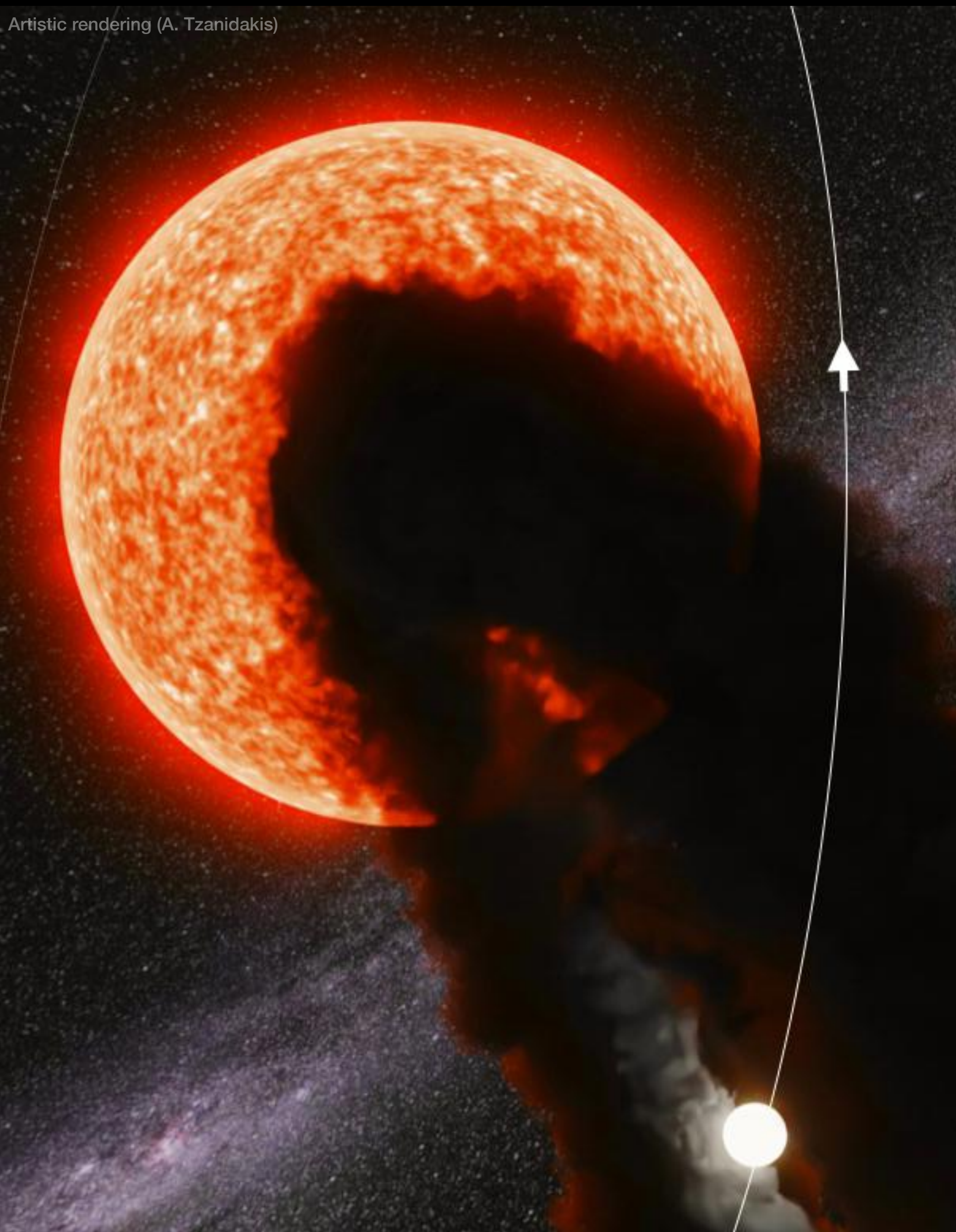
Disk Eclipse Hypothesis



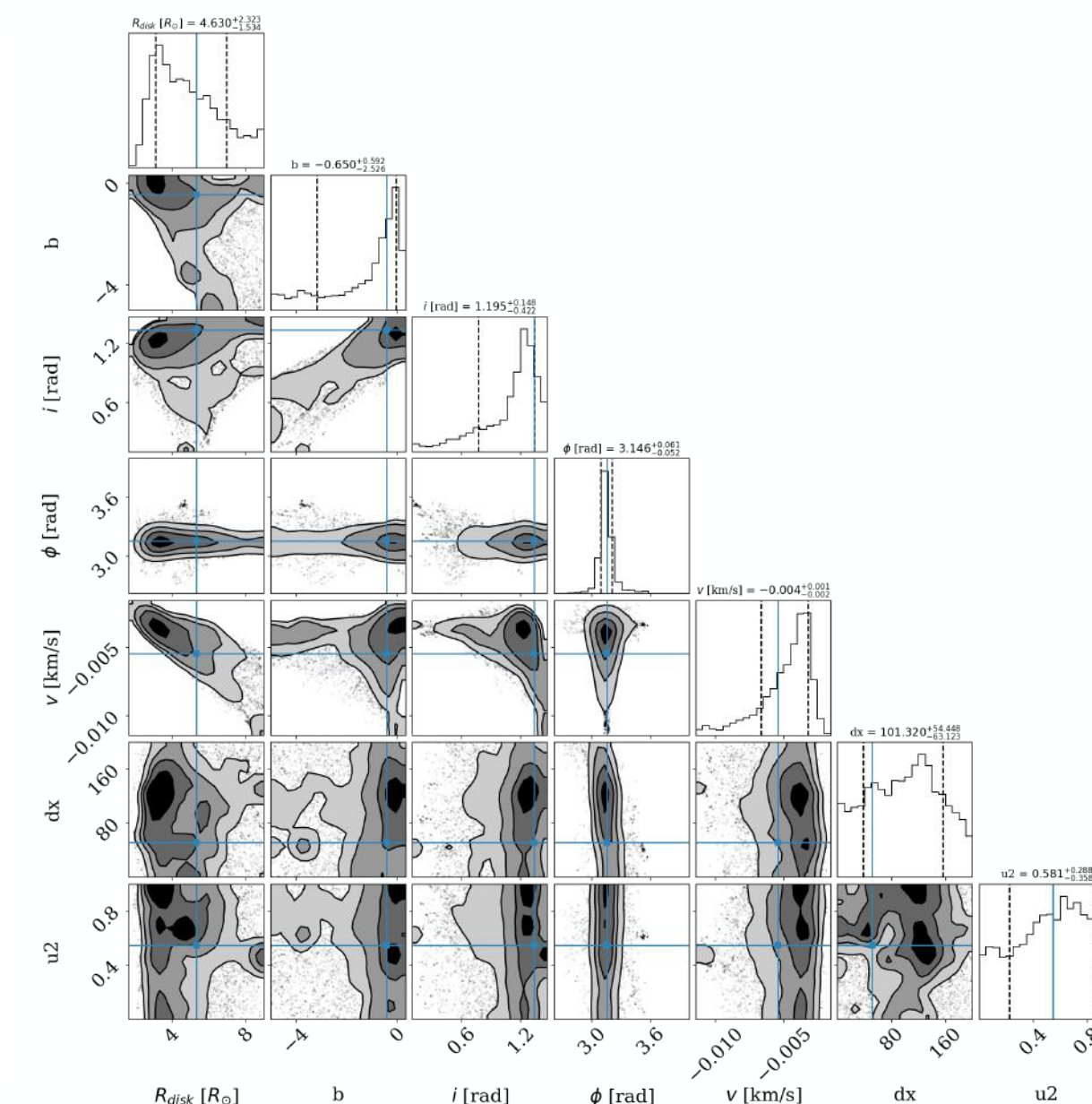
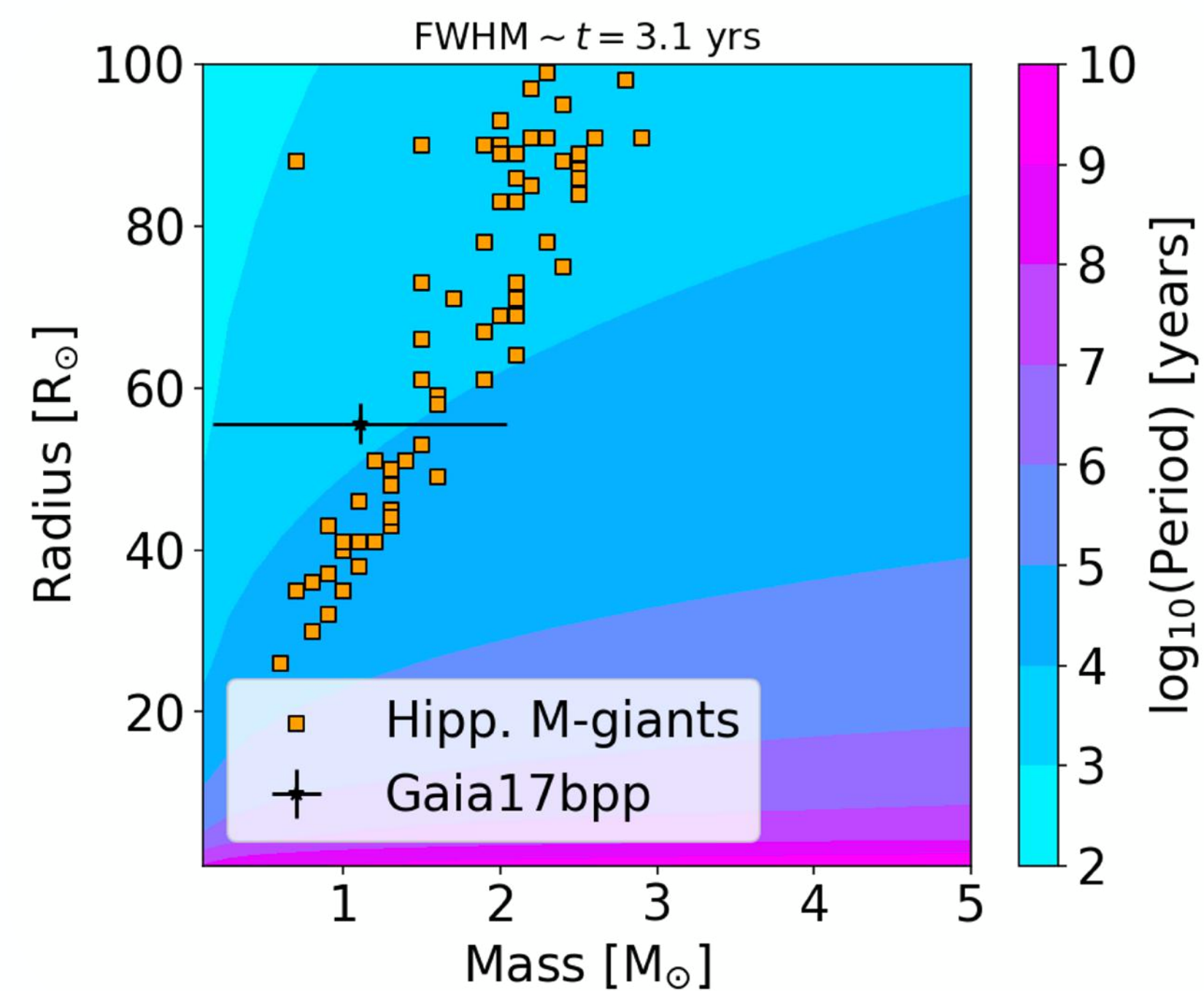
- Optical vs. infrared colors are consistent with a dusty disk obscuring our view from the star
- Infrared colors show a “blue bump” that might be indicative of a hot companion or scattering light due to dust



Artistic rendering (A. Tzanidakis)



Possible Orbital Configuration



- Preliminary models suggest a slow-moving disk companion $\sim 1\text{-}3$ AU radius disk very far away ($\sim 50\text{-}100$ AU)
- A possible orbital configuration can allow the orbital period to be 100-1000 years. These can be a once-in-a-lifetime eclipses!

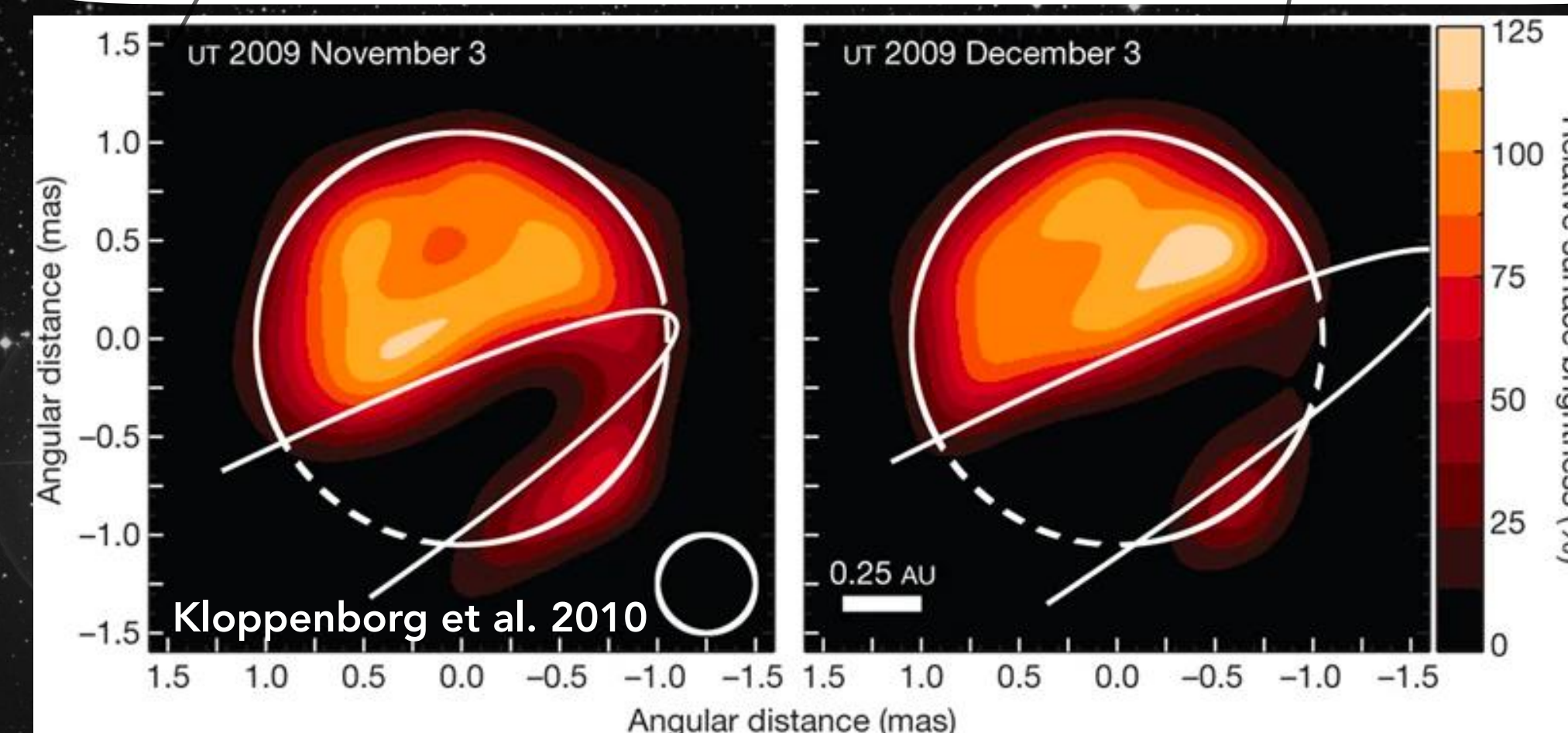
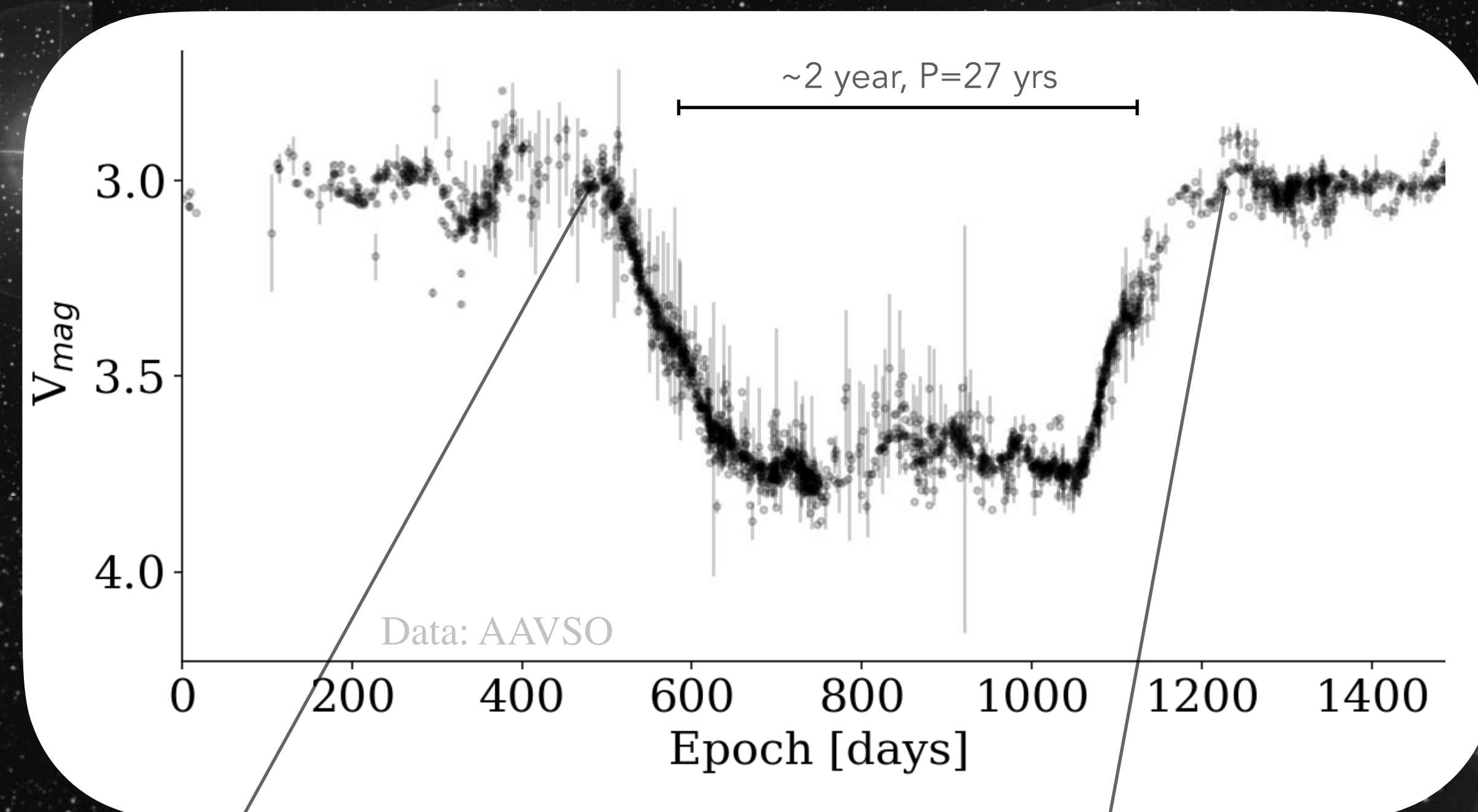
A 100-year-old Stellar Mystery: Epsilon Aurigae

E-Aur Facts:

- 2-year-long eclipse every 27 years
- F-supergiant with a B5-V star

Ongoing Challenges

- Disk composition?
- Presence of rare-earth elements
- Disk origin?
- How often do such systems form?

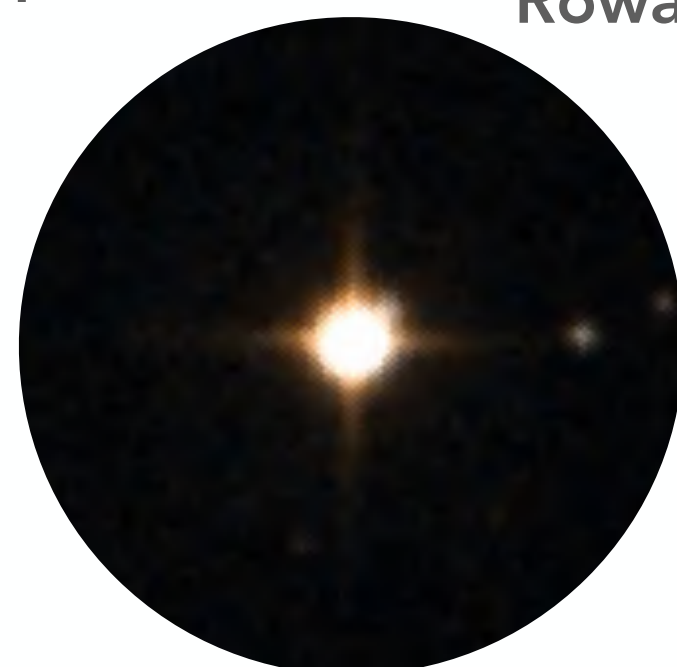


A New Emerging Population of Binary Stars?

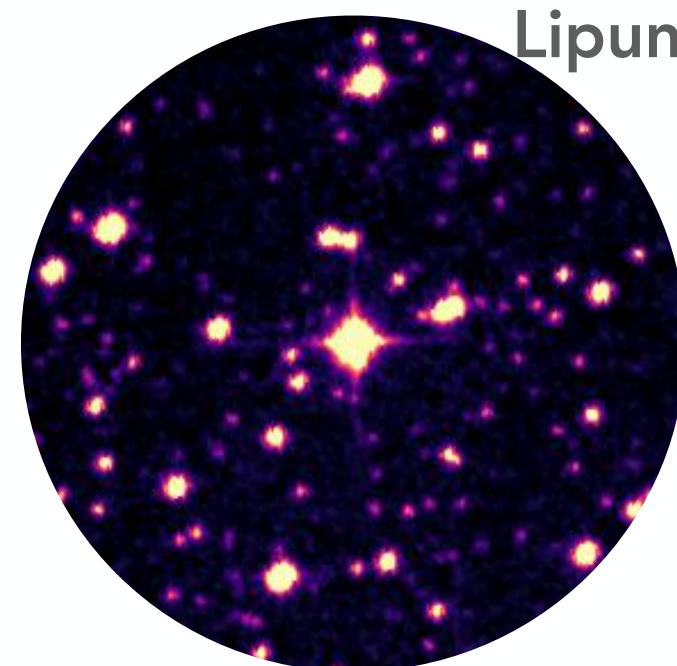
Ludendorff 1904



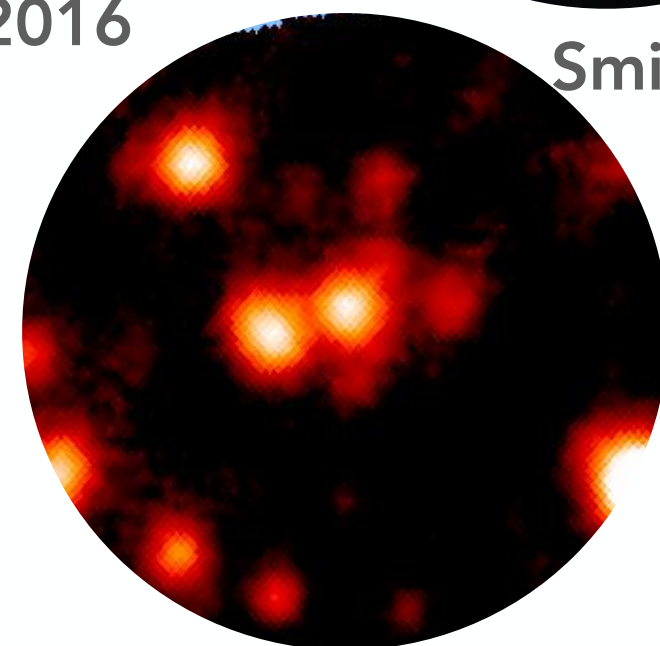
Rowan et al. 2021



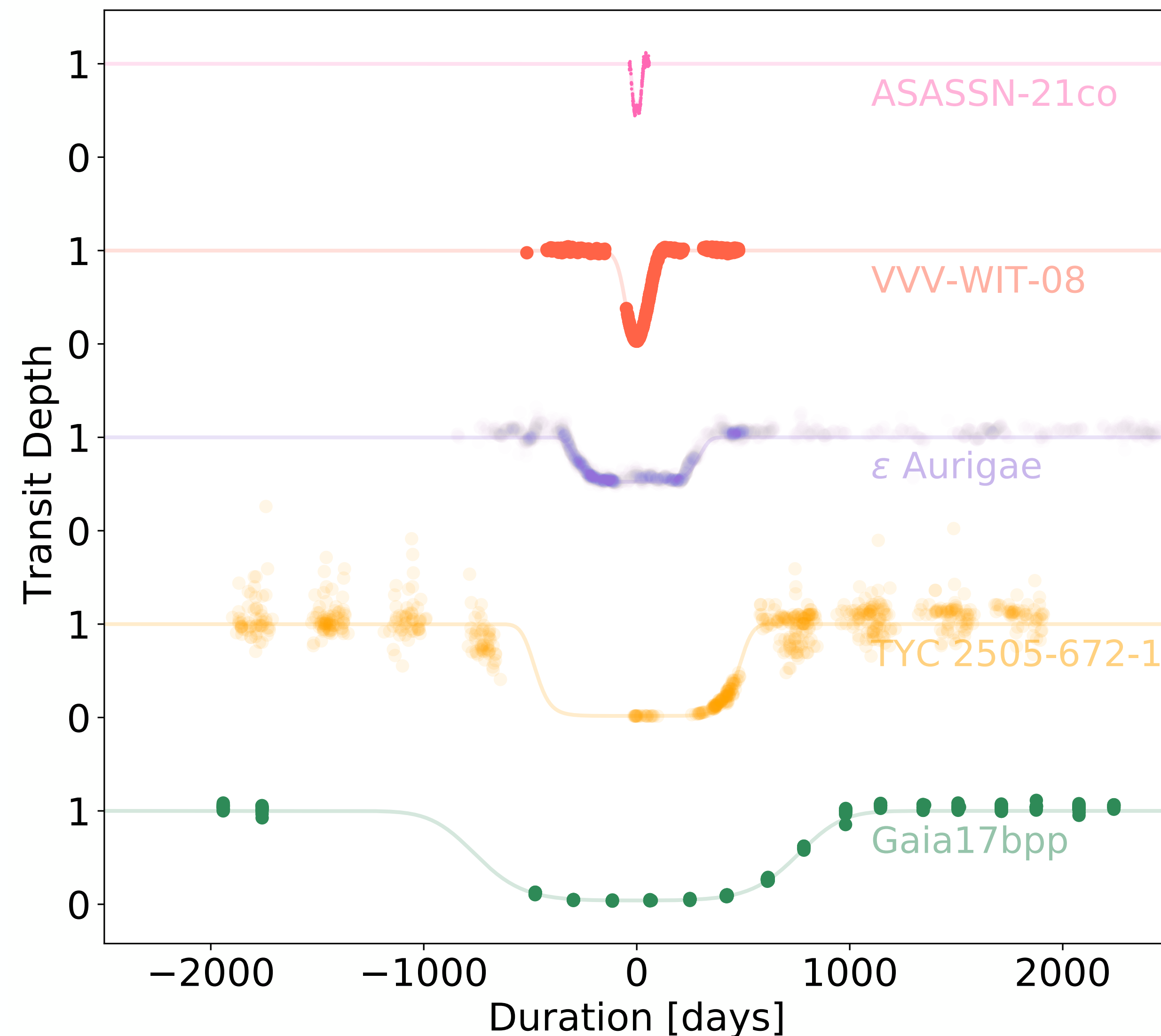
Lipunov et al. 2016



Smith et al. 2021



- Gaia17bpp holds the record for the longest and deepest dimming event of a giant star.
- Possible record holder for longest orbital period binary system
- Future surveys like the Legacy Survey of Space and Time (LSST) will find many more!



Summary

1. Discovery of unusually large and long dimming event. No previous large dimming events detected in the last few decades

2. SED analysis and broad band photometry indicates the primary star being a M3-III star with 4100 K, 55 R_{\odot} and $1.2 M_{\odot}$

3. Color-phase evolution indicates the presence of a dusty-disk like eclipse from a possible hot companion

Contact: Andy Tzanidakis | atzanida@uw.edu | (347)-703-9210

Acknowledgments

