Starspot Imaging

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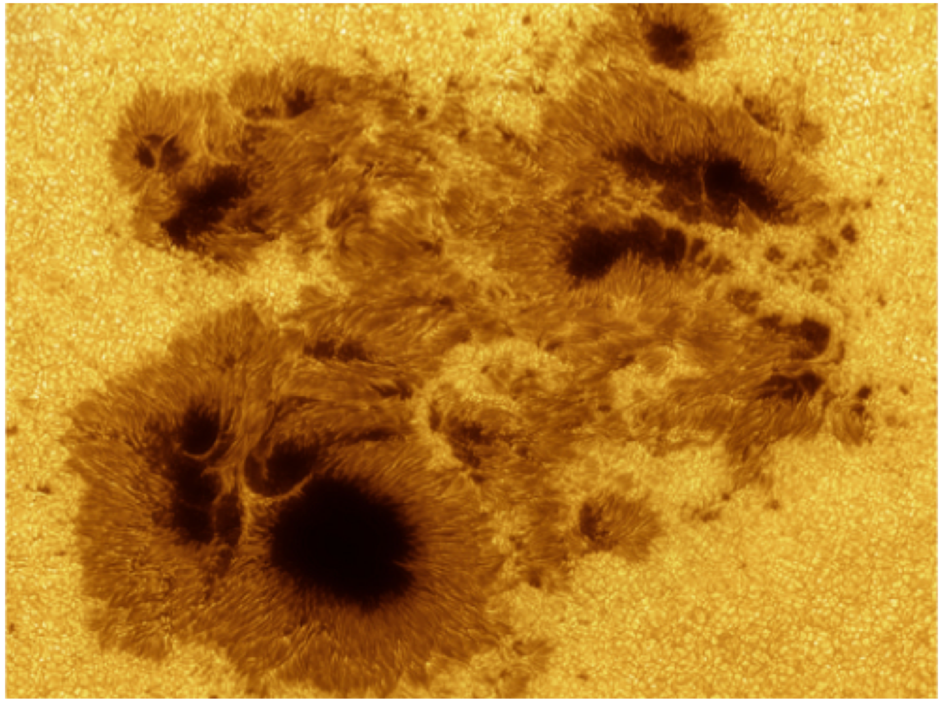
EXPRES: Debra Fischer, Sam Cabot, John Brewer, Joe Llama, Ryan Petersburg, Andrew Szymkowiak, Lily Zhao

Bob Harmon, Heidi Korhonen, Greg Henry

Starspots

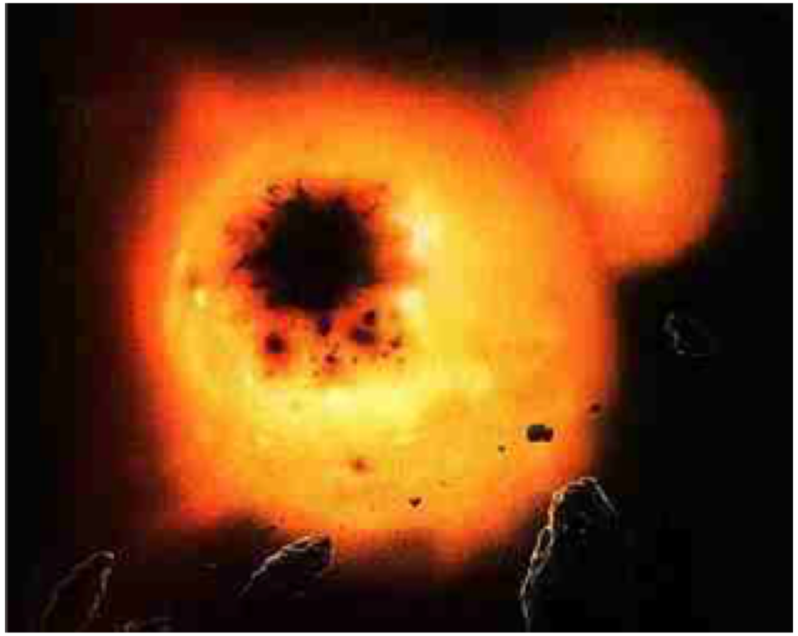
- Strong magnetic fields suppress convection
- Observed as dark against the photosphere



APOD/Shivak & Friedman

RS CVns

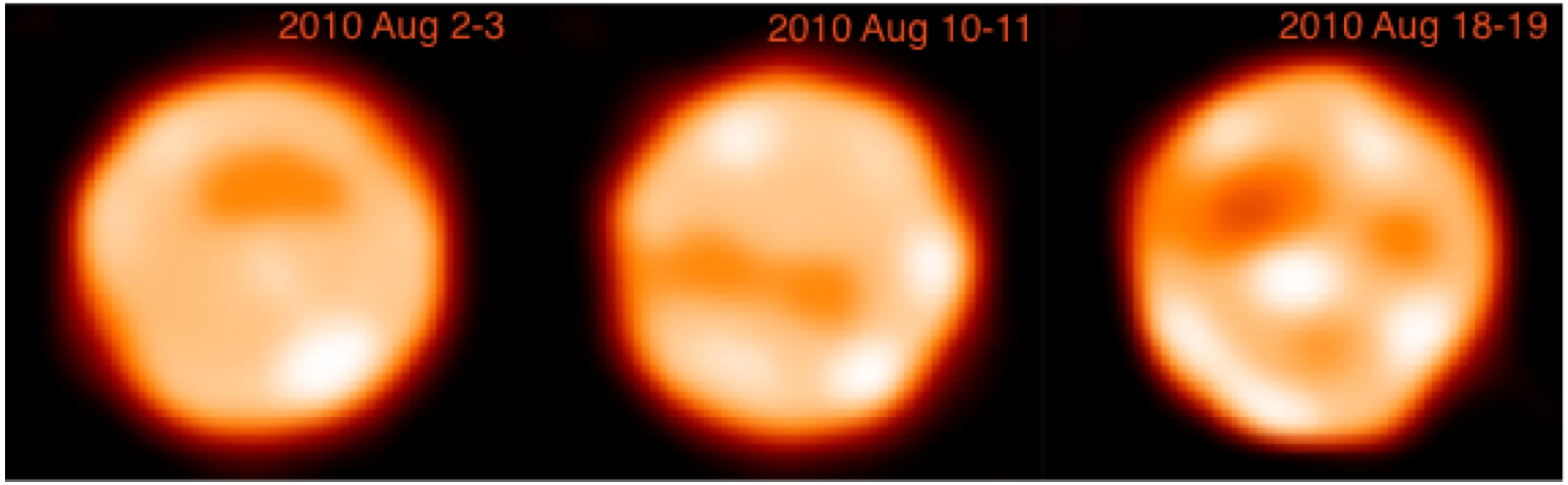
- Binary with giant primary and main sequence secondary
- Many with short orbital periods and tidally-locked



Hall 1976
Encyclopedia of Science

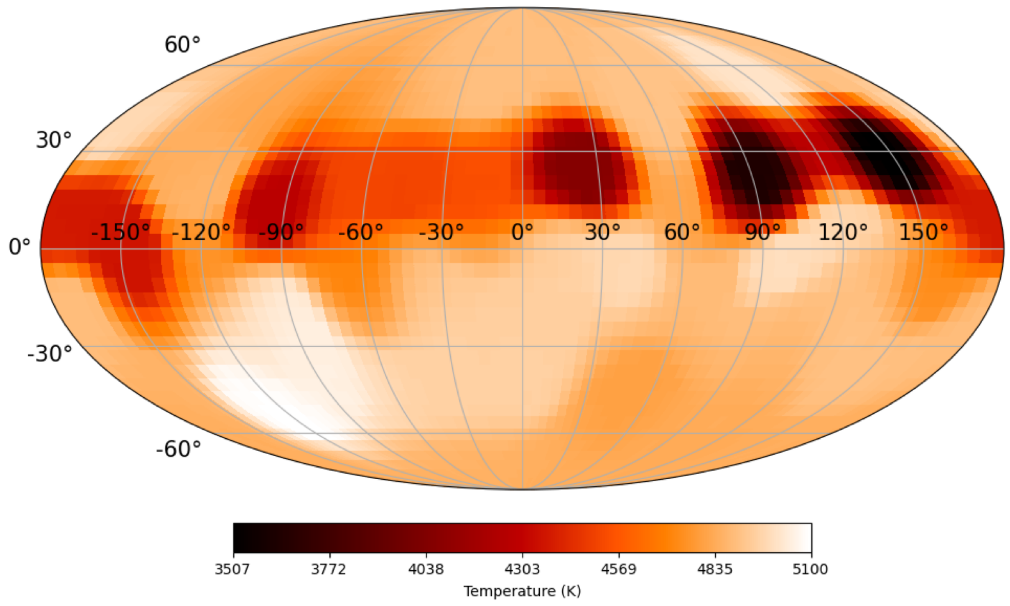
λ And with 4T MIRC

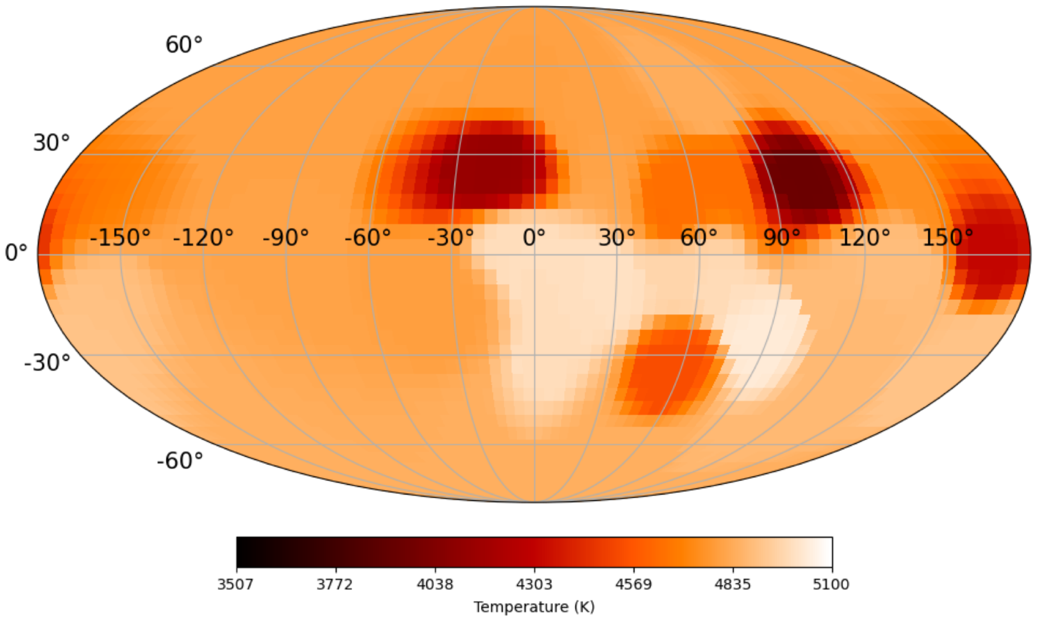
Parks et al. (2015 arXiv, 2020 submitted)



λ And with 4T MIRC

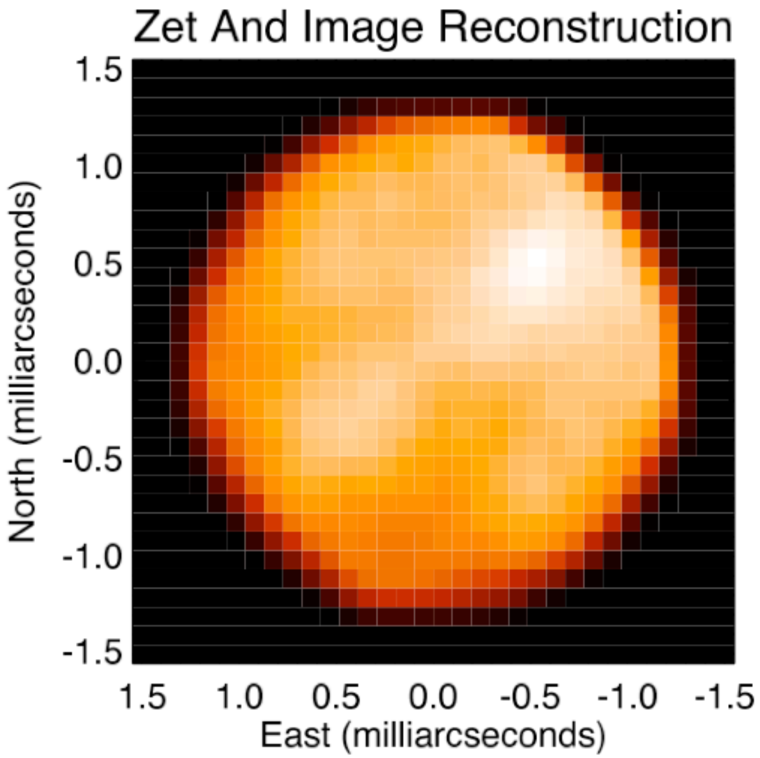
Martinez et al. (submitted)





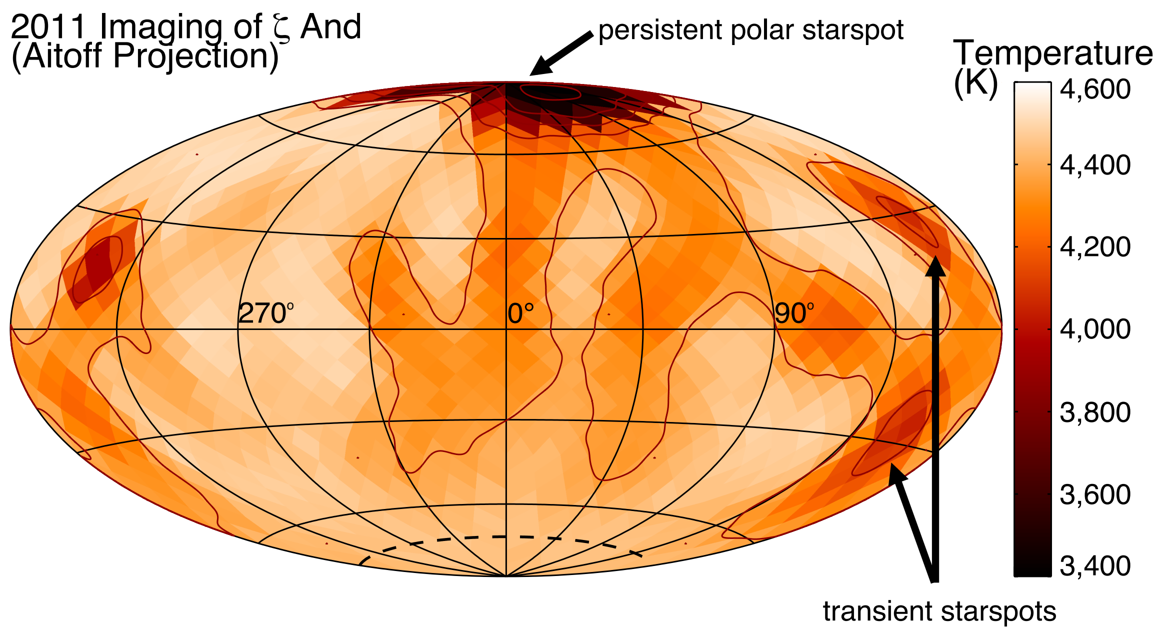
ζ And with 4T MIRC

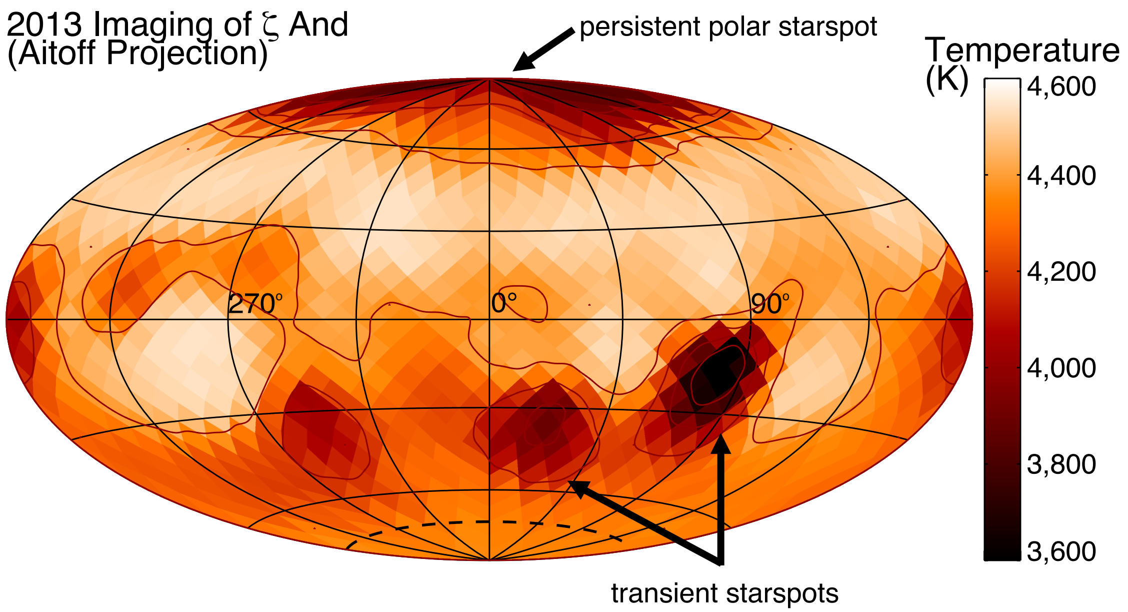
Imaged by Ettore Pedretti



ζ And with 6T MIRC

Roettenbacher et al. (2016)

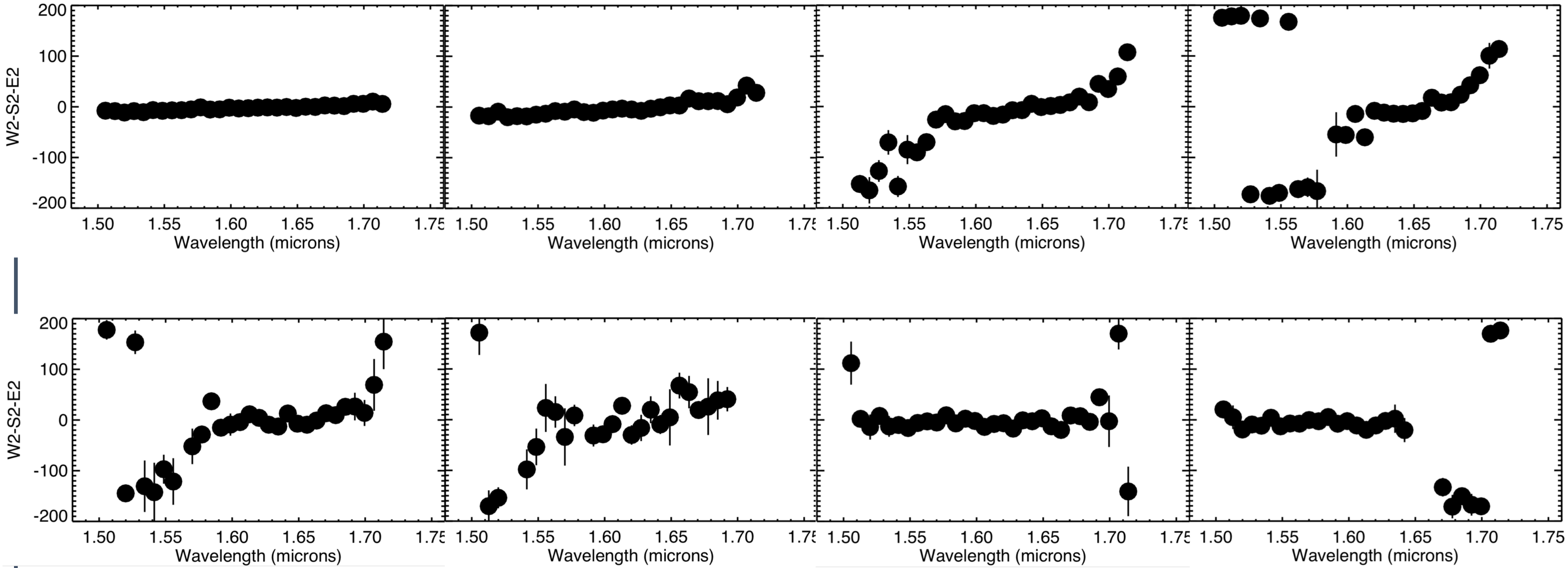




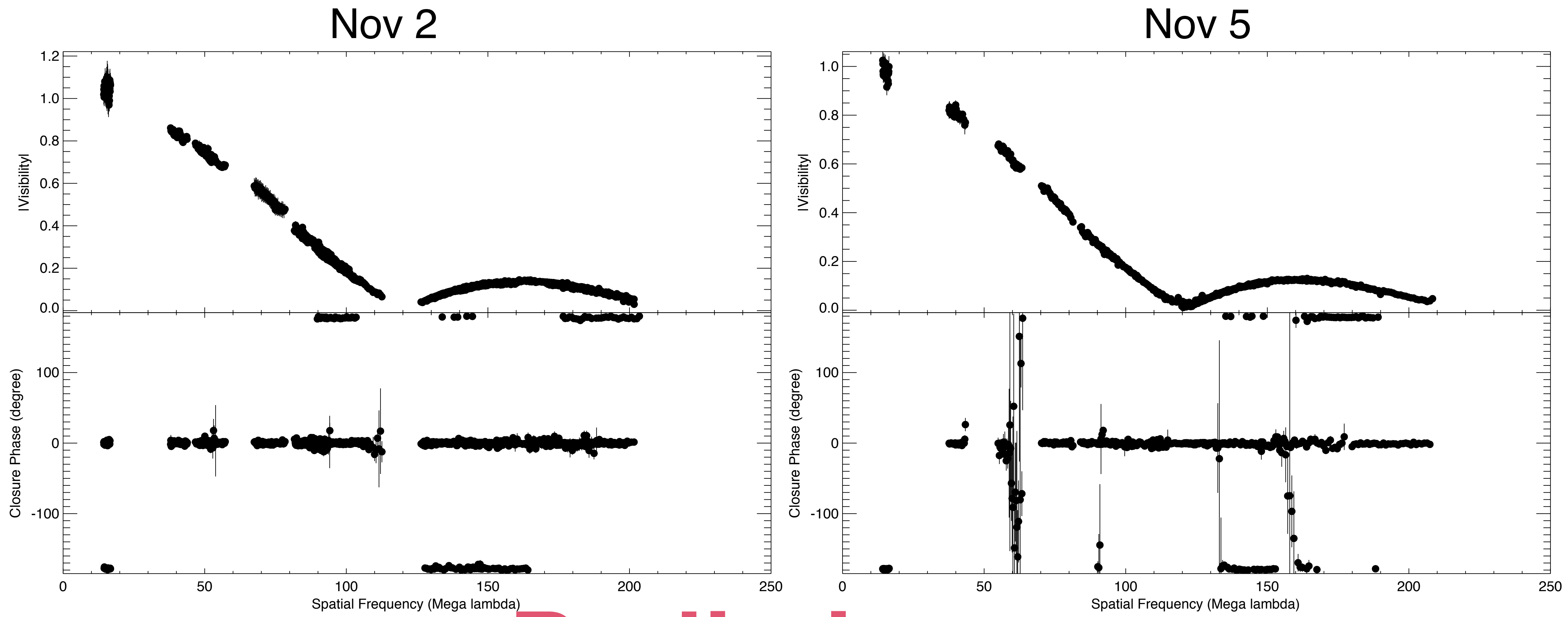
ζ And with 6T MIRC-X

- Three data CHARA/MIRC-X sets for imaging
- Measure differential rotation ~5 rotation periods
- Simultaneous spectra and photometry

ζ And with 6T MIRC-X

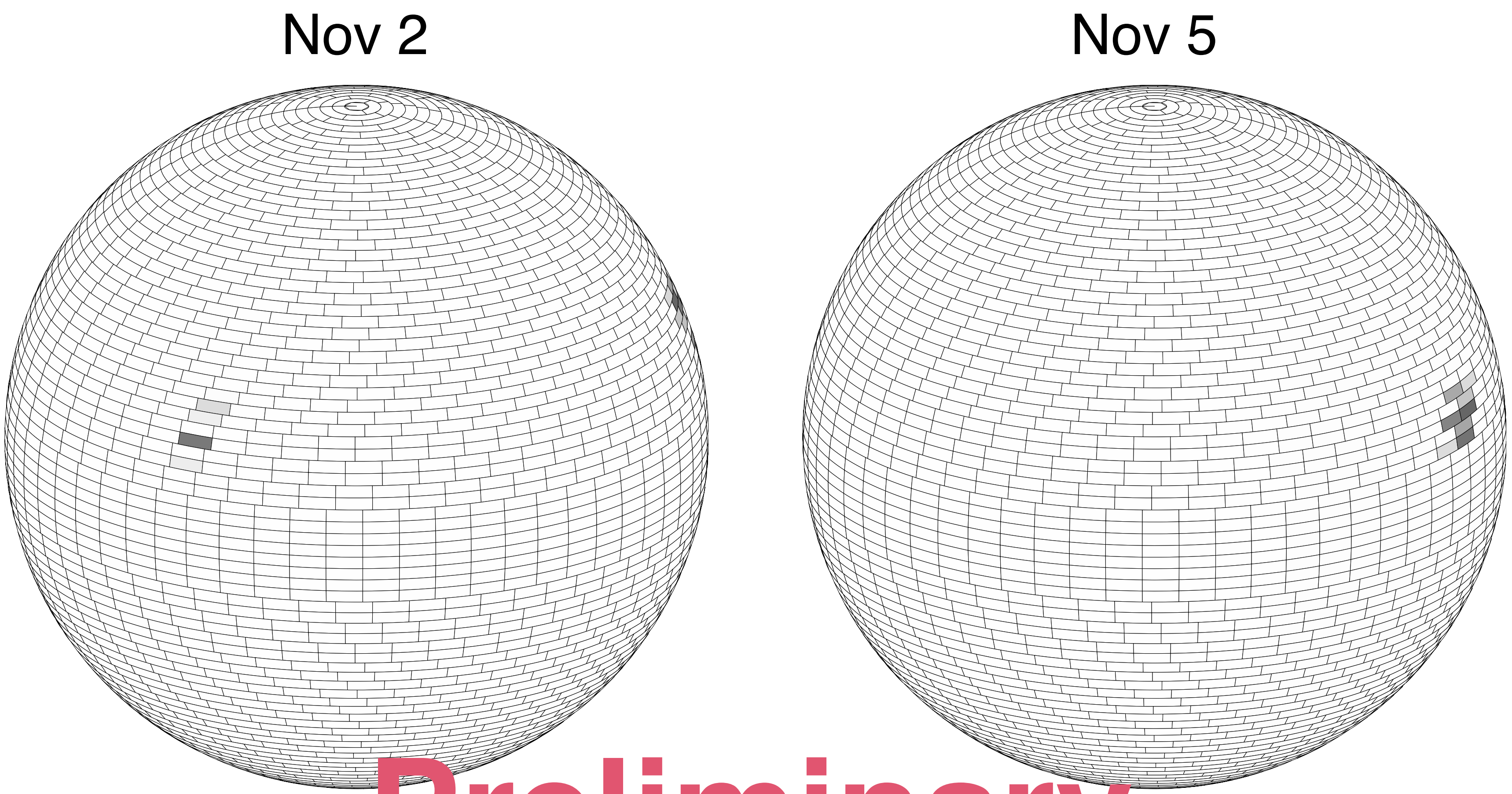


ε Eri with 6T MIRC-X



Preliminary

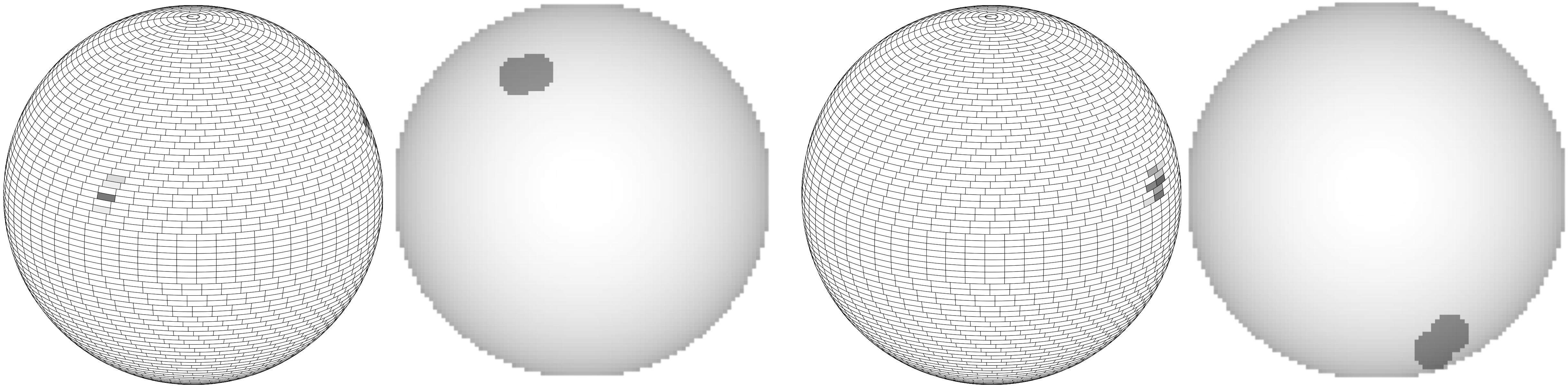
ε Eri with TESS



Preliminary

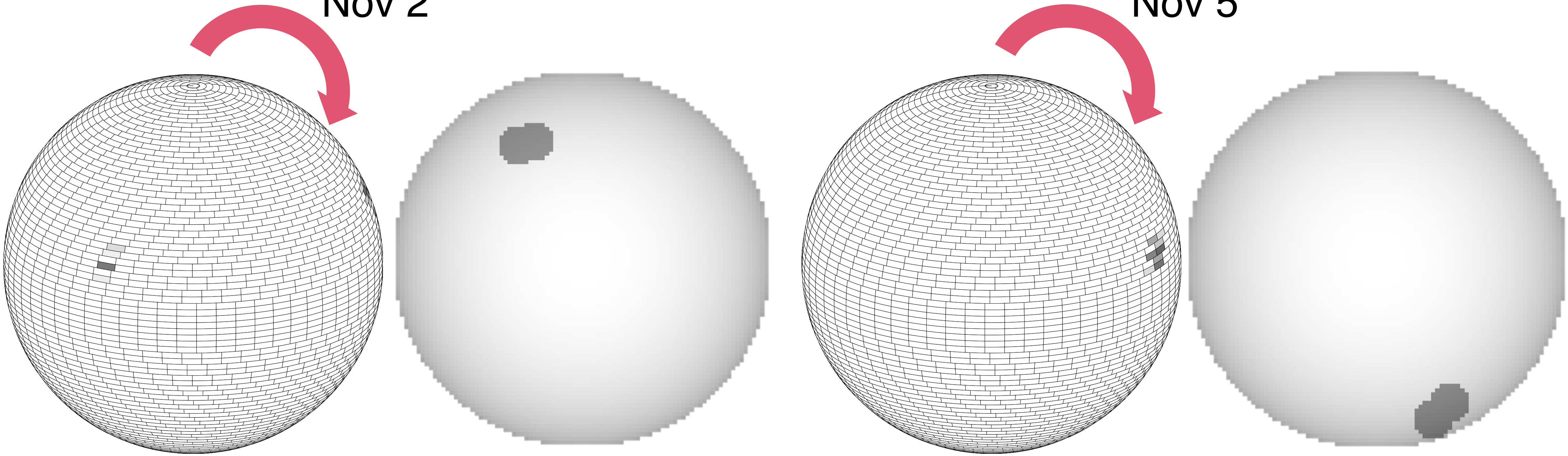
ε Eri with 6T MIRC-X

Nov 2 Nov 5



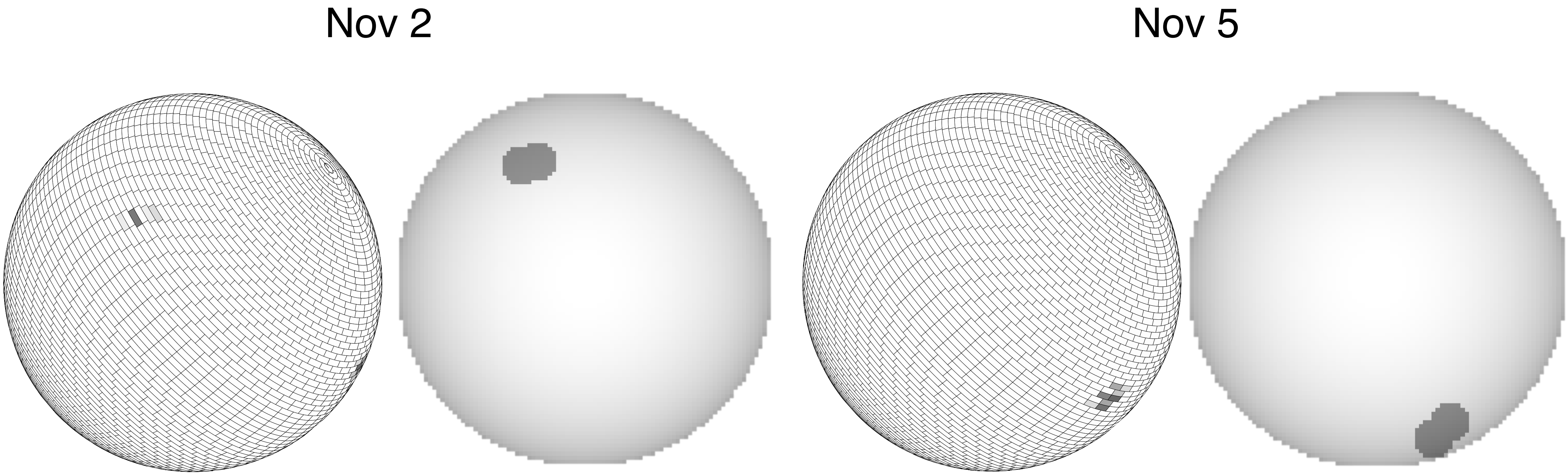
Preliminary

ε Eri with 6T MIRC-X



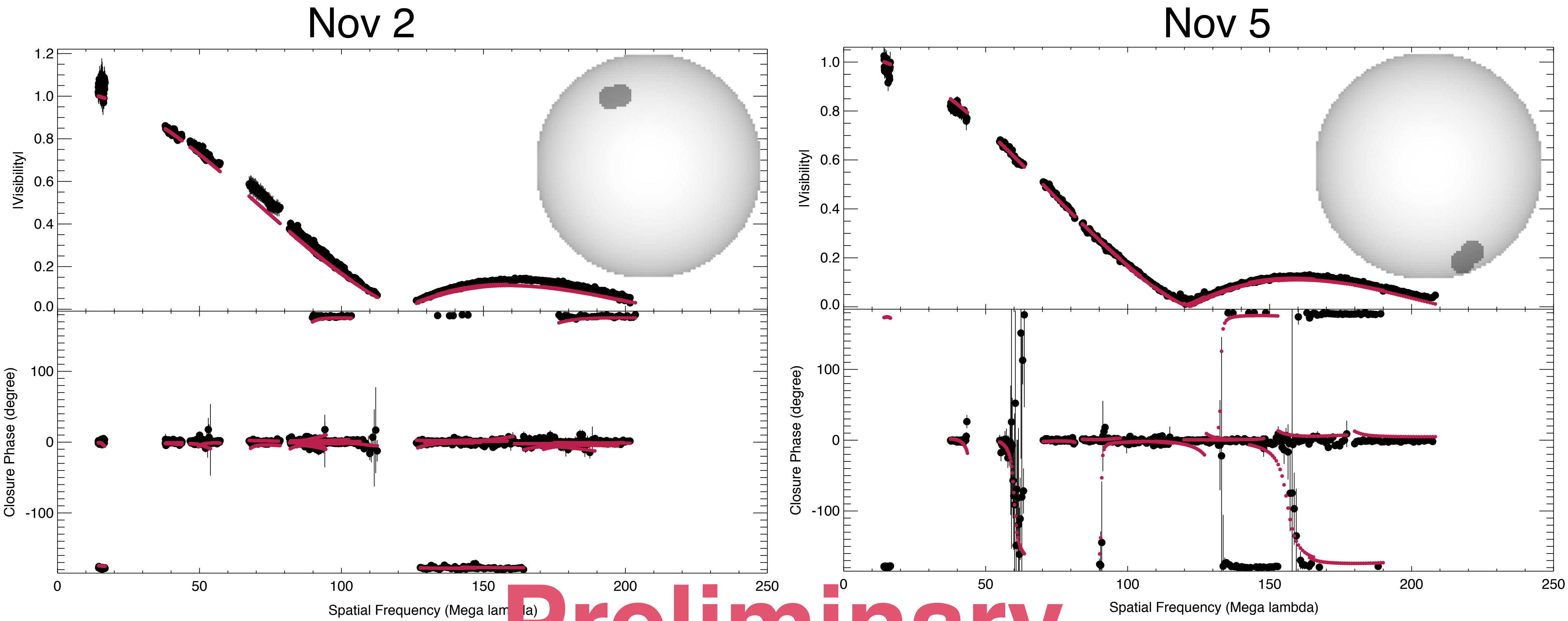
Preliminary

ε Eri with 6T MIRC-X



Preliminary

ε Eri with 6T MIRC-X



Preliminary

Imaging Starspots

- Past studies
  - Long-term evolution
  - Not all active star dynamos are sunlike
  - Consistency with other imaging techniques
- New studies
  - Investigating structure of outer stellar layers
  - Imaging sunlike stars
  - Aiding planet hunters identify spot signatures
- Future project expansions aided by
  - SPICA
  - Additional CHARA baselines