Long-Term Variability of HBC 379

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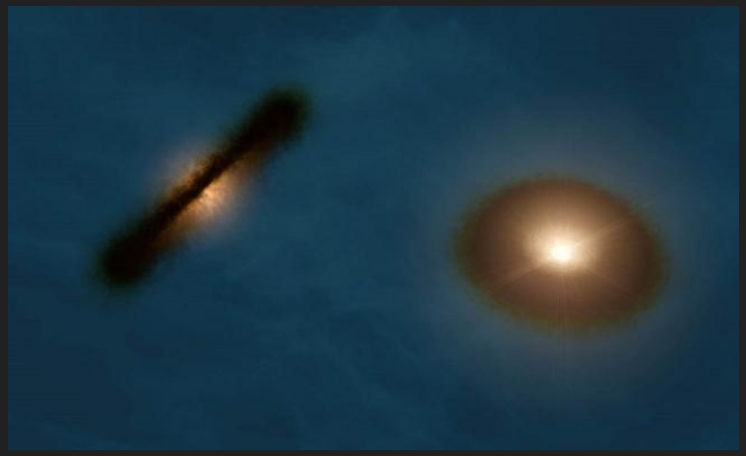
Young Binary Stars

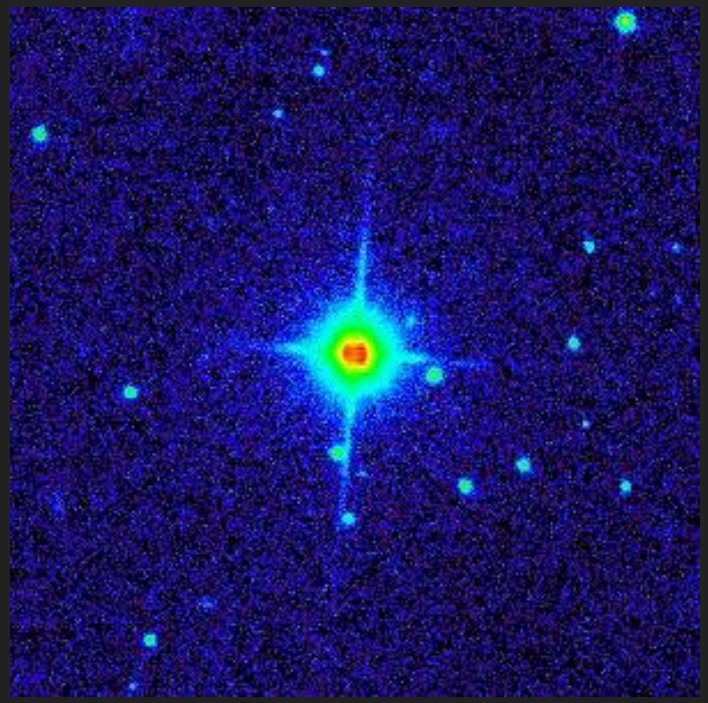
- Studying young binary stars helps better understand their formation and evolution
- Looking at circumstellar disk properties helps to understand planet formation and evolution
- Variation in stellar rotation period due to dissipation of disk and contraction of young star
- Goal was to monitor magnitude to find rotation period and inclination



Artist's representation of ALMA HK Tau

HBC 379

- Located in Taurus star forming region
- Very young (~2Myr)
- Primary (more massive) spectral type: M0.5
- Primary star effective temperature: 3870K
- Estimated (from Baraffe et al. 2015 models) radius of primary star: 1.9 R_{sun}
- Binary separation: 1.1 arcsec



HBC 379 from the Sloan Digital Sky Survey

MIT Field Camp

- Gathered historic photometric data
- Used resources such as SIMBAD and VizieR
- K. N. Grankin, J. Bouvier, and F. J. Vrba
- Goal was to get a long-term light curve and verify period so inclination could be calculated

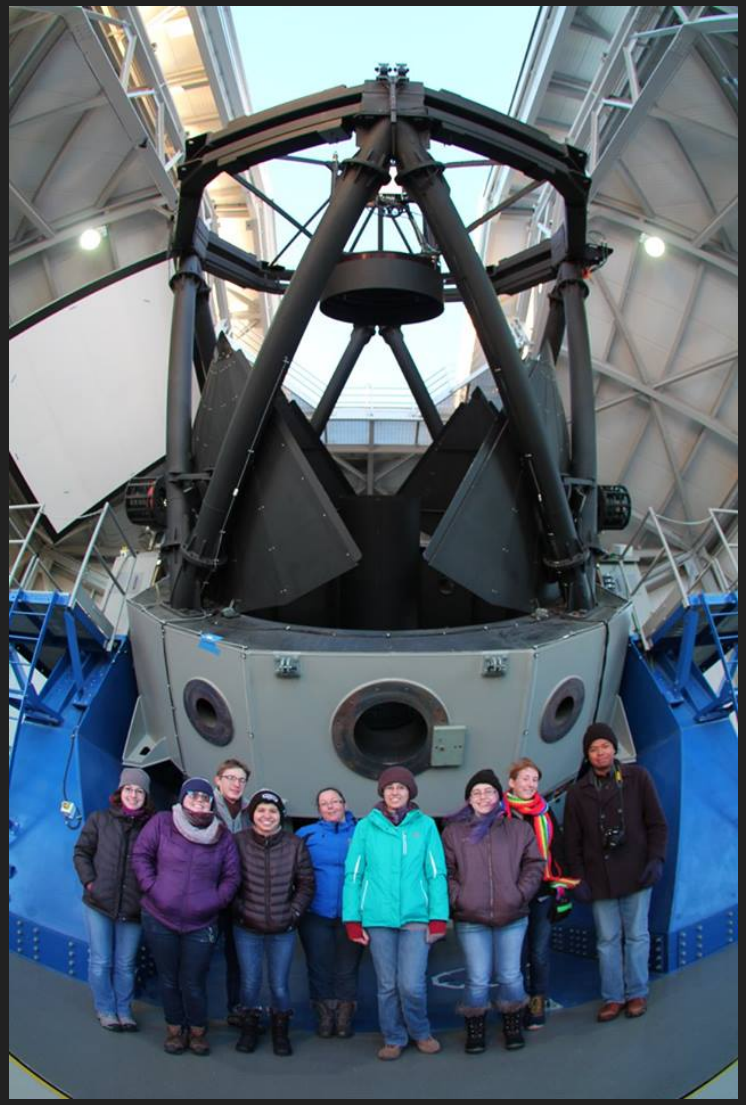
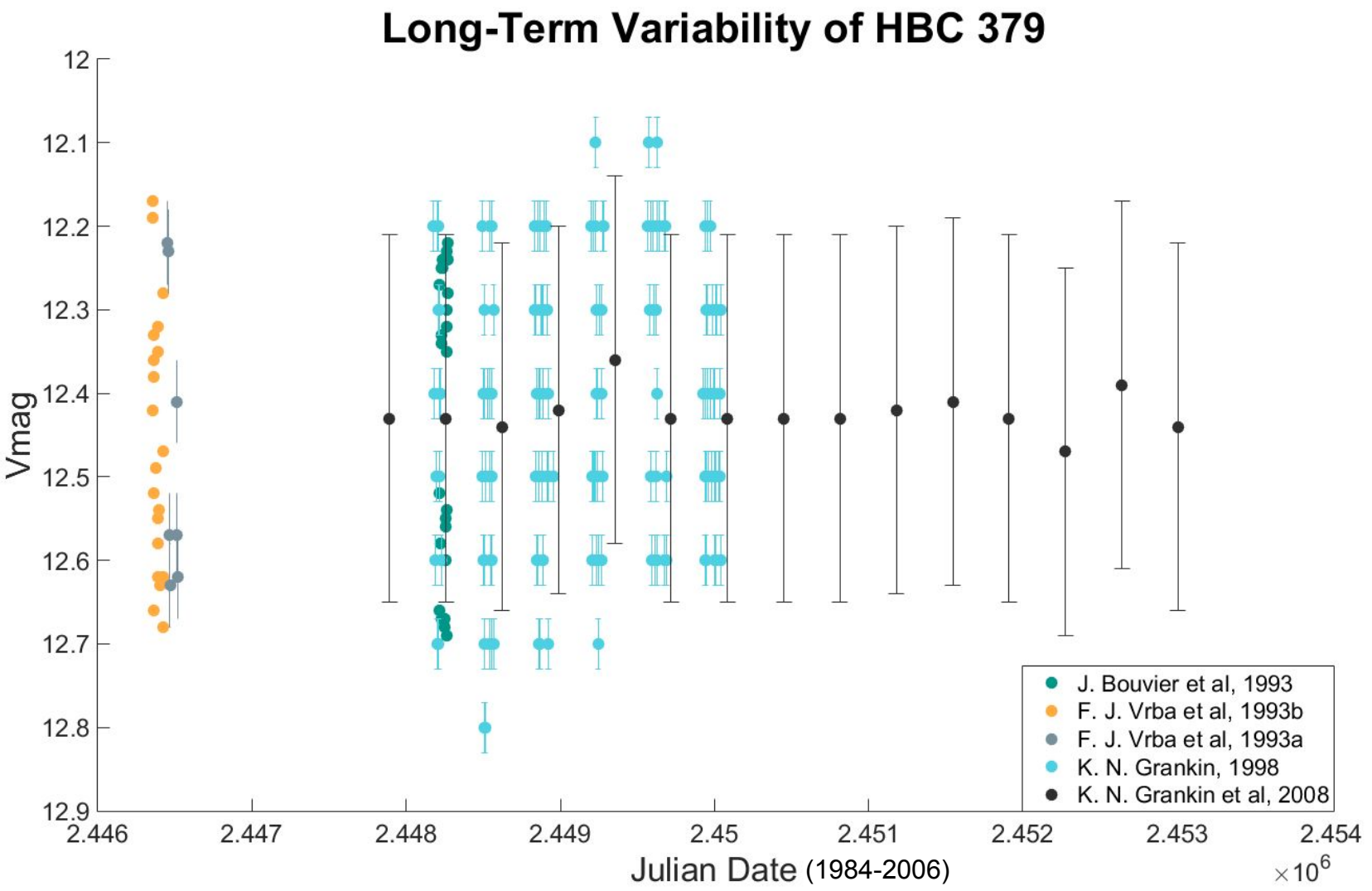
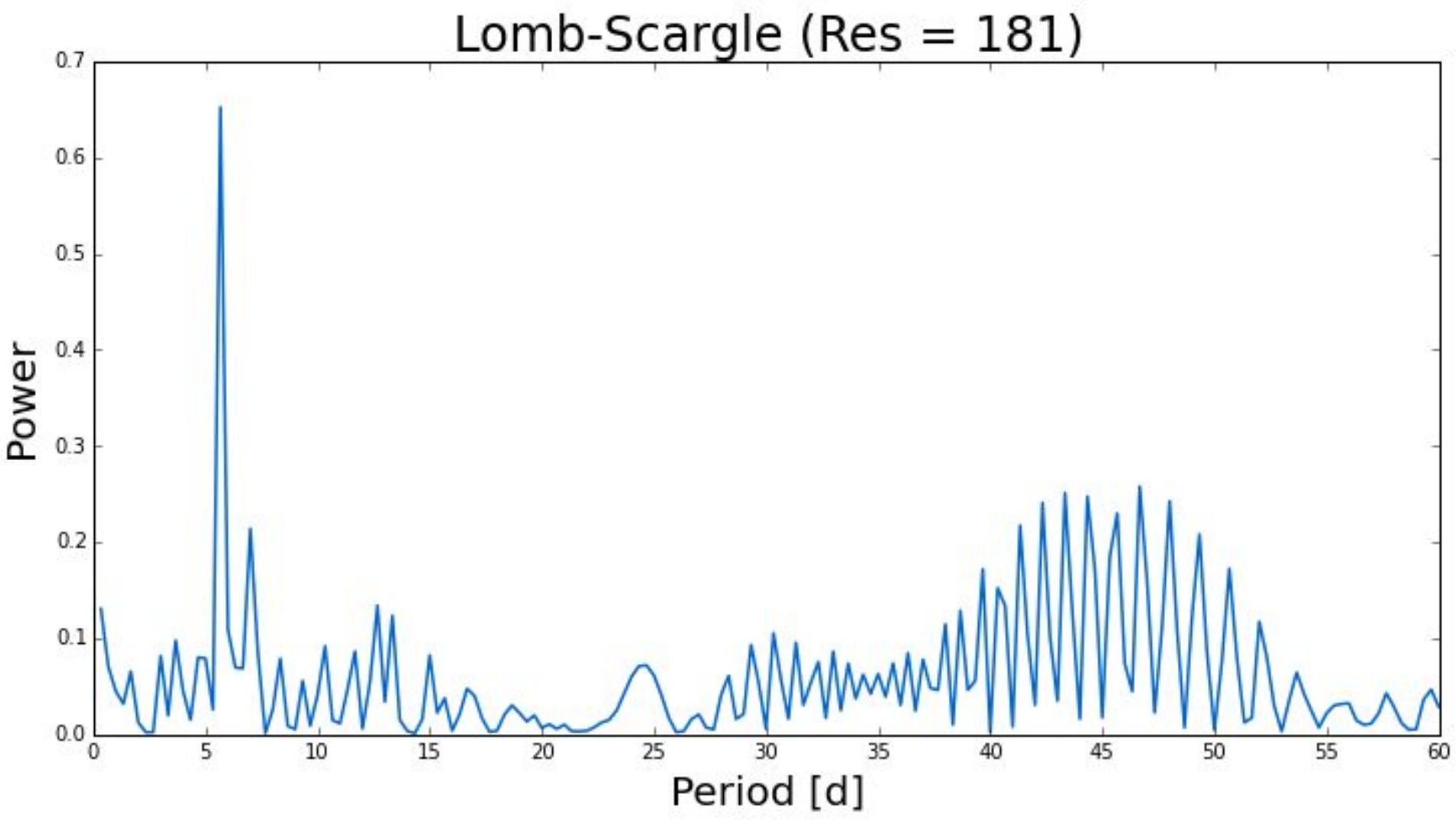


Photo credit: Amanda Bosh

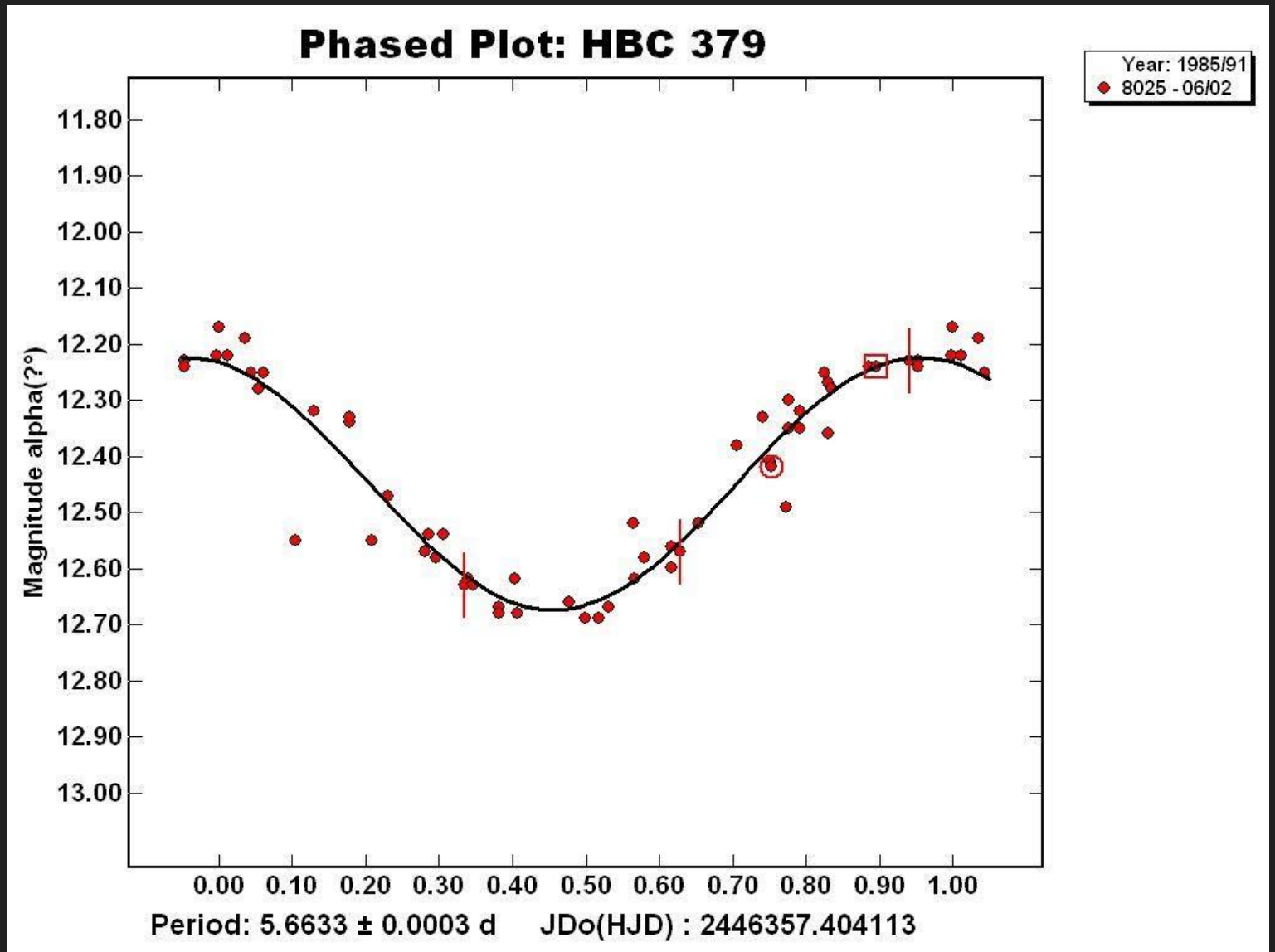
Full Light Curve



Period Verification



Phased Plot


Phased Plot: HBC 379
Year: 1985/91
8025 - 06/02
Magnitude alpha(?°)
11.80
11.90
12.00
12.10
12.20
12.30
12.40
12.50
12.60
12.70
12.80
12.90
13.00
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
Period: 5.6633 ± 0.0003 d JDo(HJD) : 2446357.404113

Period Determination

$v\sin(i) = 14 \pm 3$ km/s

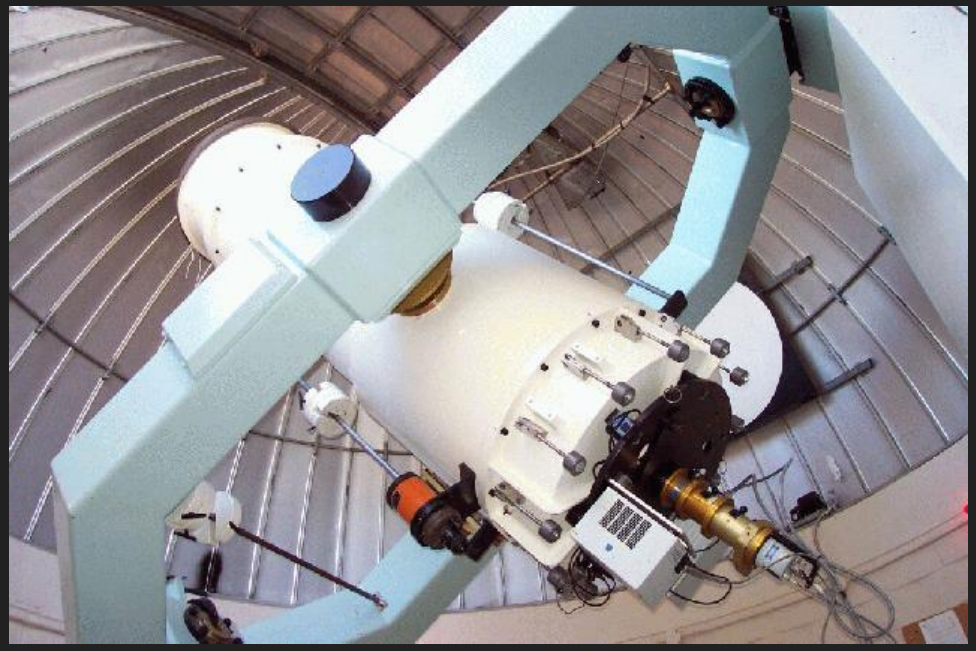
$R = 1.9\ R_{sun}$

$$\frac{2\Pi R}{P_{rot}} sin(i) = v sin(i)$$

The inclination of the stellar rotation axis toward Earth from the plane of the sky: 55.0 +/- 0.2°

Conclusions/Future Work

- Determine inclination of secondary (Torres, G., et al. 2013)
- More sources of data
- Verify period by taking data
- Other targets



Works Cited

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