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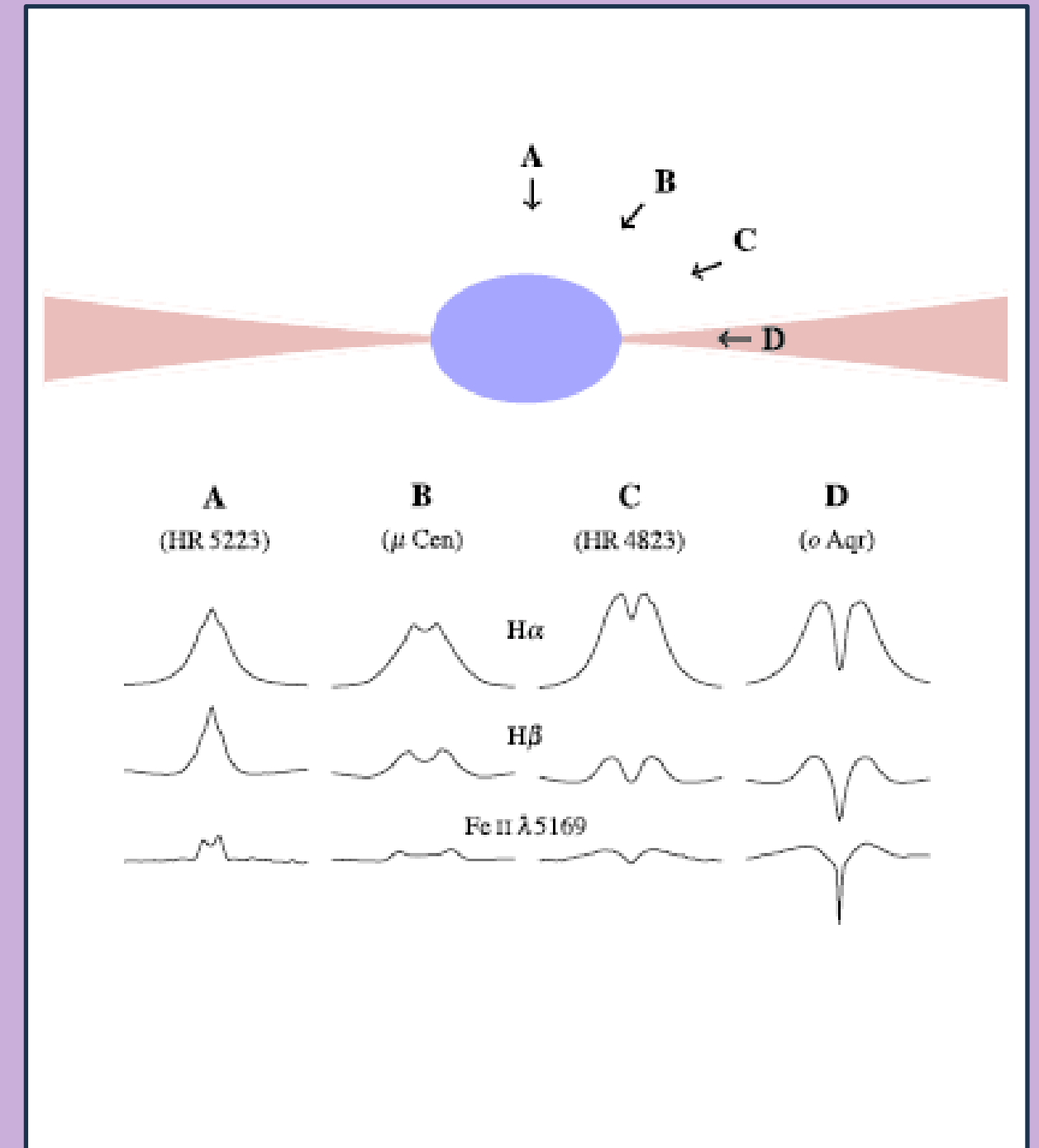


Mentor: Michael Hayden

Identification and Classification of eclipsing Be stars

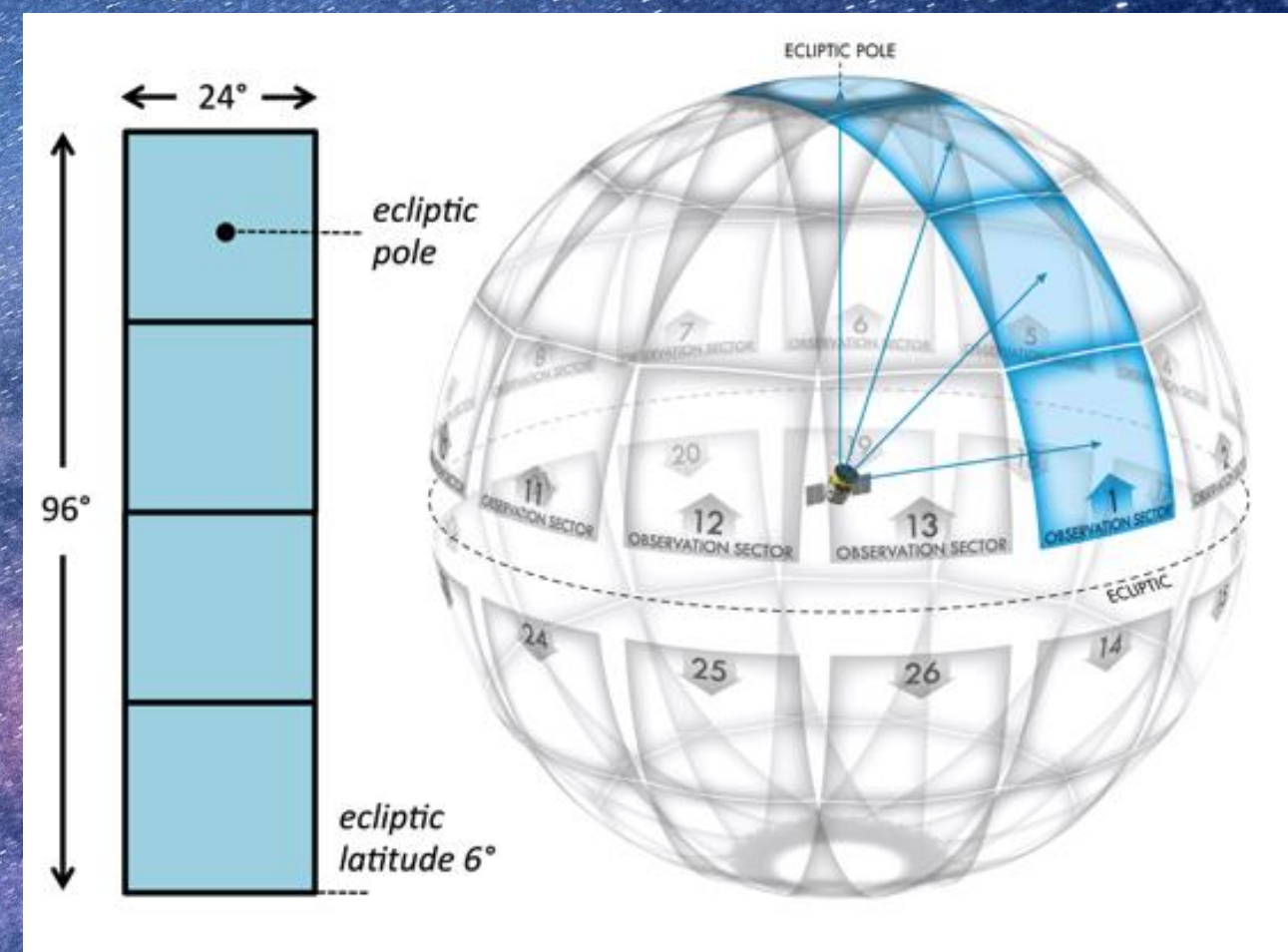
What is a Be star?

- A Be star is just a B- type star that shows or has shown Balmer emission lines.
- Usually, the emission lines are strongest for hydrogen (like H α) but there are also emission lines from other elements like helium, iron, etc.
- On this Project we will only concentrate on Classical Be



TESS (Transiting Exoplanet Survey Satellite):

- We are looking at eclipsing Be stars.
- TESS is a NASA space telescope that acts as an ultra precise light meter, continuously measuring the brightness of many stars. It works by detecting microscopic flickers or dips in a star's light. In other words. It records photometry, not spectra.
- To map the entire sky, TESS divides it into 26 sectors (slices of the sky), observing each one for 27 days.



SPOC and SAP/PDCSAP



- TESS doesn't send pictures of planets and stars, but massive, uncalibrated streams of raw pixel data and full frame images.
- SPOC (Science Processing Operations Center) is NASA'S specialized data processing pipeline and supercomputing hub that "cleans" and analyzes raw satellite observations
- SAP is the raw, uncorrected light curve graph that counts all the light pixels around a star but still includes spacecraft noise and background glare.
- PDCSAP is the clean, flattened version of that same graph with all telescope errors mathematically stripped away.

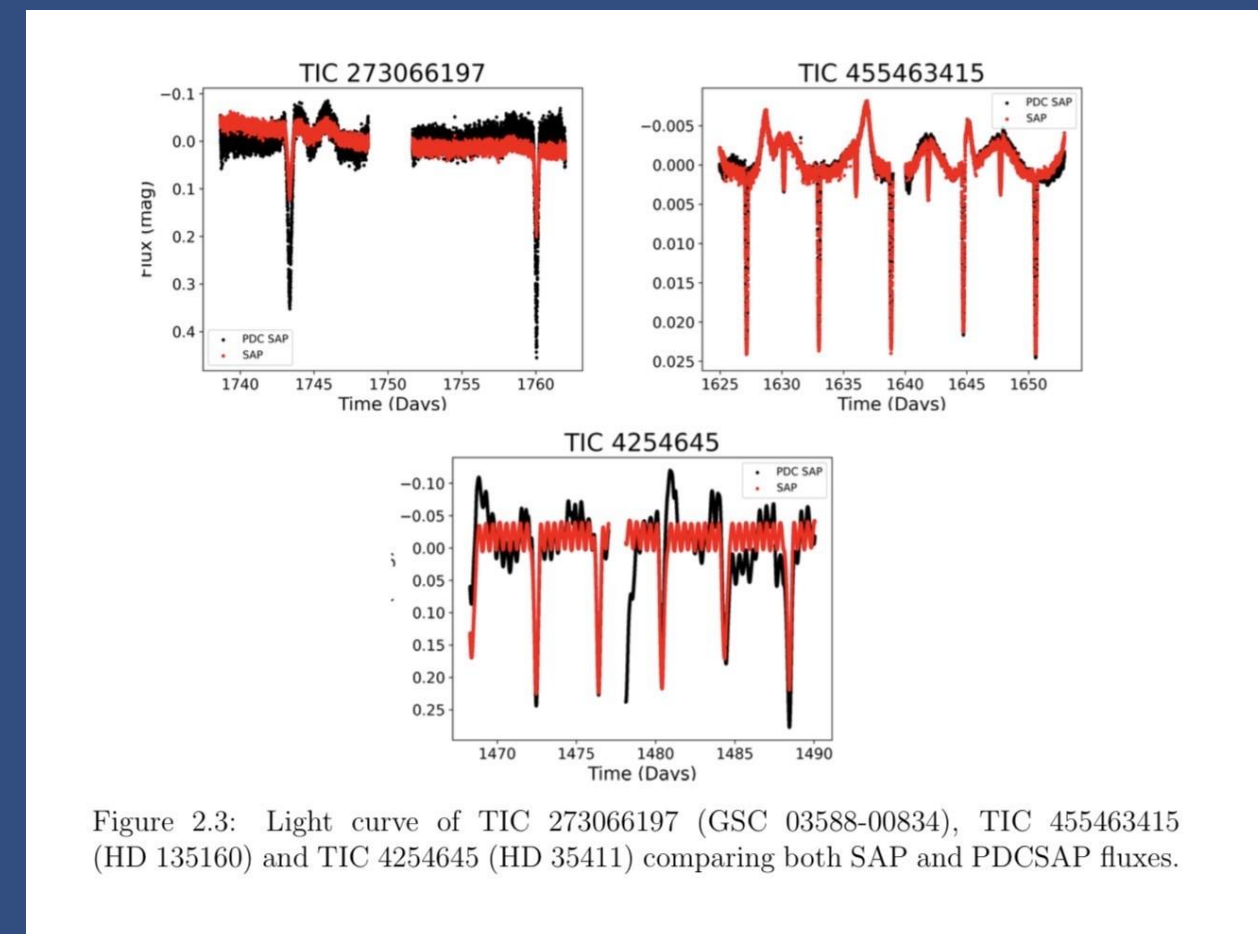


Figure 2.3: Light curve of TIC 273066197 (GSC 03588-00834), TIC 455463415 (HD 135160) and TIC 4254645 (HD 35411) comparing both SAP and PDCSAP fluxes.

Nagaraj Vernekar, "On the photometric and spectroscopic variability of Be stars: the case of HD 93683," Master's Thesis, KU Leuven (2021), p. 15, Figure 2.3.

What is the purpose of the project?

- Identify classical eclipsing Be stars.
- Verify that they are truly eclipsing and there is no “cross contamination” from other systems.
- Obtain radial velocity curves with the purpose of further understanding companion stars in a binary star system and their interaction with the Be star.
- Build models.
- Have a better understanding of how the Be phenomenon occurs.



Thank you!

Questions?