

Spectral variations of Be/shell star Pleione connected with its 218^d binary period.

Lubomir Iliev

*Institute of Astronomy and National Astronomical Observatory,
Bulgarian Academy of Sciences*

Anatoly Miroshnichenko

*University of North Carolina, (USA), Fesenkov Astrophysical Institute, Almaty,
Kazakhstan*

Be/shell star Pleione

Pleione is a prototype of a group of Be/shell stars that represent cyclic changes in their spectral appearance. Binary solution was found for a period of 218d (Nemravova et al. 2010). Recently Iliev et al. (2023) reported about $H\alpha$ outburst in the spectrum of Pleione in 2016 based on observations on ESO-VLT Unit2 in Chile. Here we report detailed study of a set of parameters of the strongest emission line in the spectrum of Pleione during 4 periastron passages. New results reveal unknown before details about developments in the circumstellar envelope of Pleione.

Observations

- Observations used in the present research were retrieved from the archives of Three College Observatory and BeSS database.

Info about the spectra from TSO could be found at:

<https://www.shelyak.com/produit/complete-eshel-system/?lang=en>

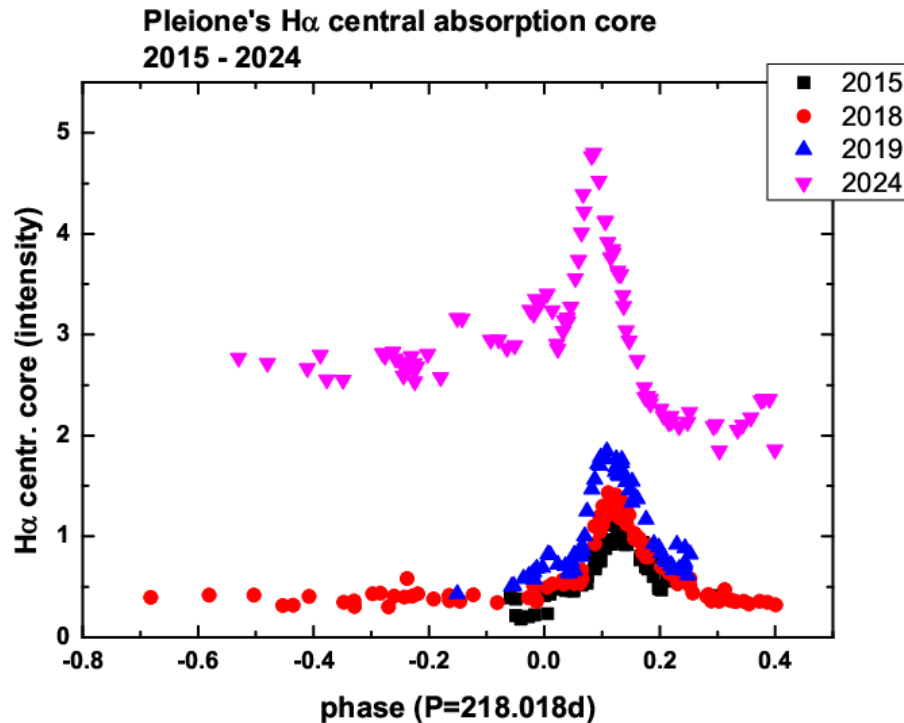
Description of BeSS data-base could be found at:

Neiner, C. 2018, SF2A-2018: Proc. Annual Meeting of the French Society of Astronomy and Astrophysics, ed. P. Di Matteo et al. and

Neiner, C., de Batz, B., Cochard, F., Floquet, M., Mekkas, A., Desnoux, V., 2011, AJ, 142, 149

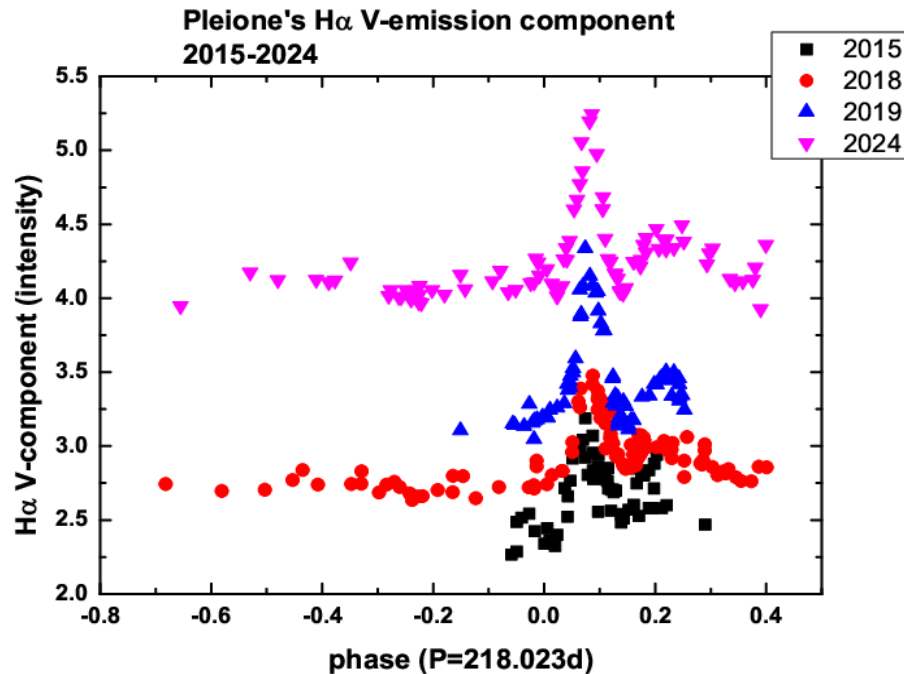
- About 500 spectra were processed and measured, more than 320 in H α region. Periastron passages in 2015, 2018, 2019 and 2024 were processed and studied in more detail. Observations were obtained with various instruments. Resolution: R = 8500 – 18000.

Variations of central absorption core of H α emission in the spectrum of Pleione during periastron passages in 2015, 2018, 2019 and 2024.



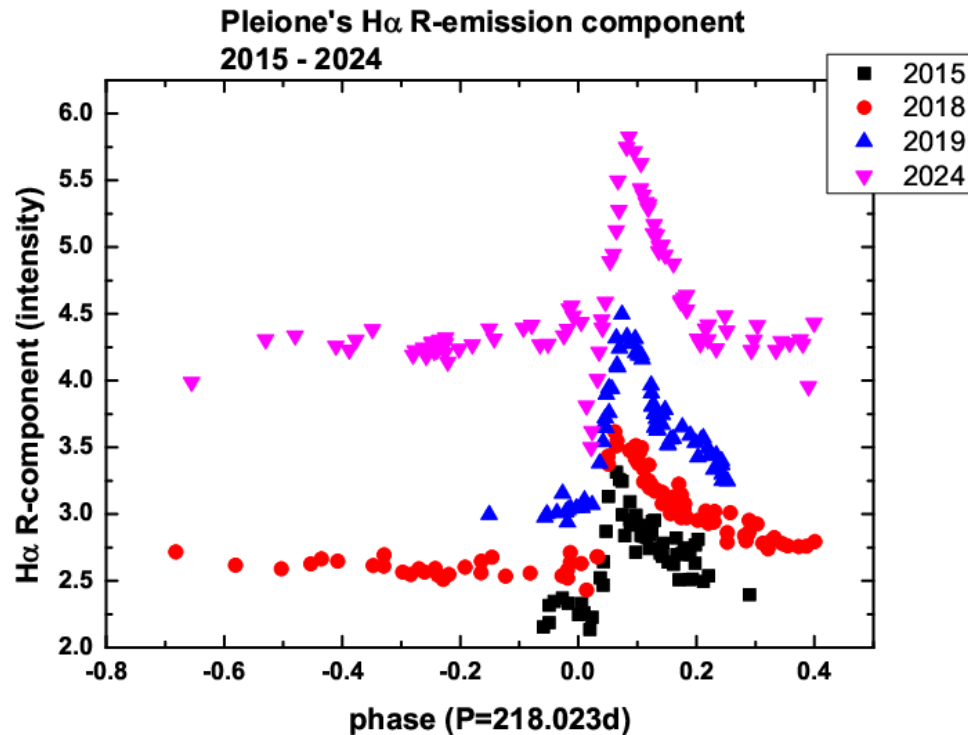
- Period of H α observations: 2015 - 2024.
- Central absorption component of H α reaches its maximum always around phase 0.1.
- Central absorption of H α at maximum is well above the continuum level for the quiet phase.

Variations of H α V-emission component in the spectrum of Pleione during periastron passages in 2015, 2018, 2019 and 2024.



- Period of H α observations: 2015 -2024.
- V-emission component of H α reaches maximum always at phase 0.1.
- During several of the periastron passages there are several maximums possibly caused by a structure in the circumstellar envelope.

Variations of R-emission component of $H\alpha$ profile of Pleione during periastron passages in 2015, 2018, 2019 and 2024.

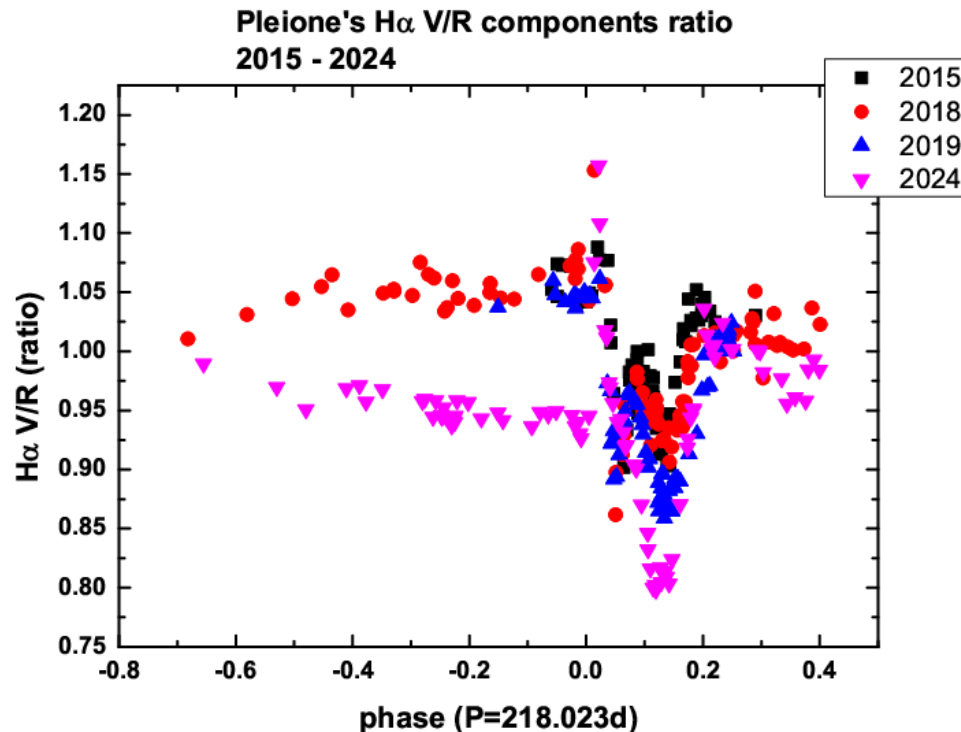


- Period of $H\alpha$ observations:
2015 - 2024.

- R-emission component of $H\alpha$
also reaches maximum always at
phase 0.1.

- R-emission changes differently
than V-emission.

Variations of V/R ratio of H α profile of Pleione during periastron passages in 2015, 2018, 2019 and 2024.



- Period of H α observations:
2015 - 2024.

- Changes of V/R ratio start
immediately after the periastron
passage.

- V/R changes in different way for
different periastron cycles.

**That is all for now.
Thank you!**

Litomyšl, Czech Republic, September 9-13, 2024