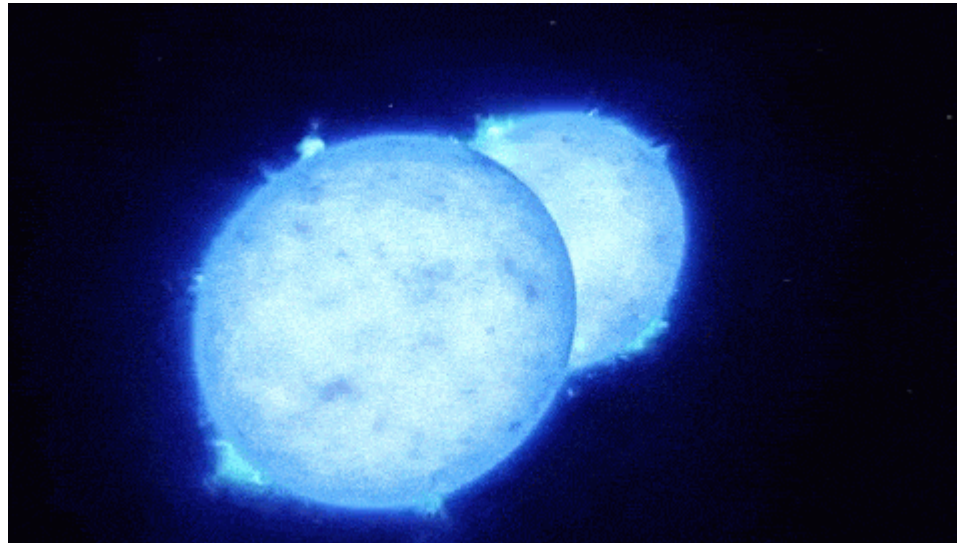
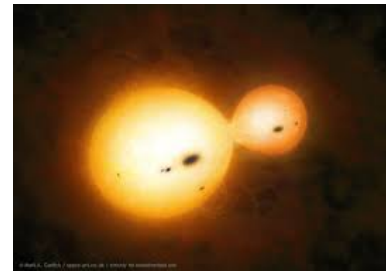


# Close binaries

especially eclipsing ones

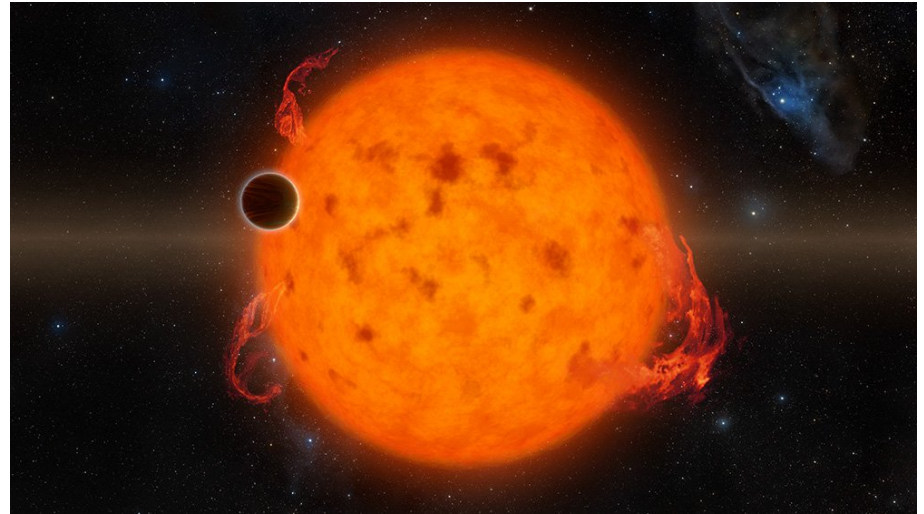


Stellar astrophysics – not topic of nowadays astrophysics unlike e.g. exoplanets or (extra)galactic astronomy

however

exoplanets

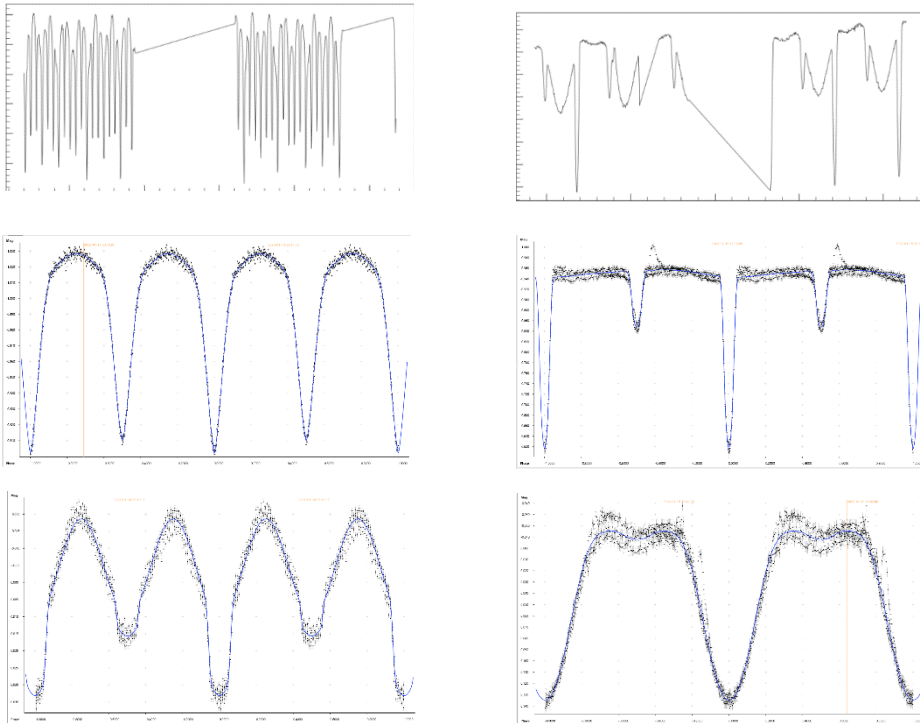
- orbits their mother stars
- the star is crucial for existence of exoplanet(s)



galaxies

- consist of stars
- stars are decisive for the shape of the galaxy

# Quadruples



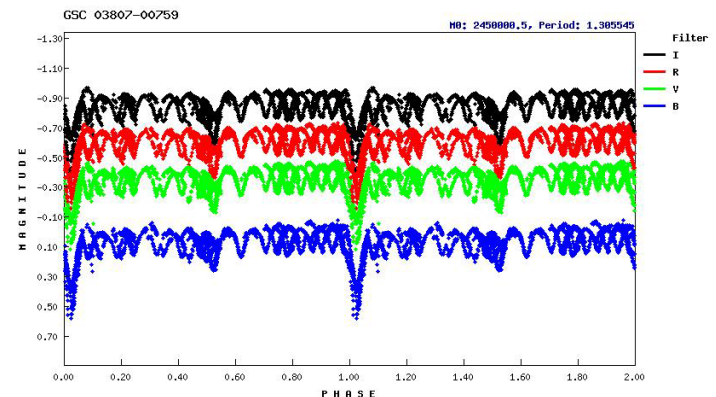
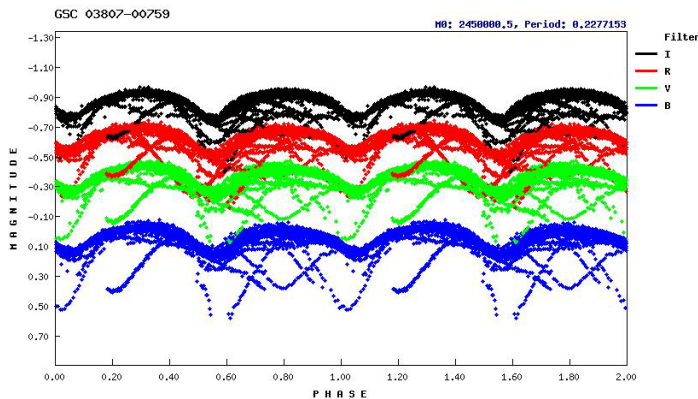
new insight to the stellar formation mechanisms (see e.g. Tokovinin 2021)

nowadays >100 systems (Zasche+,2022)

quadruple systems - common orbit around barycenter, stars with same distance, same age, and same metallicity => important for checking our models of stellar origin and evolution

Tasks:

- ❖ unveiling new quadruple systems
- ❖ detail study of the system, determination of parameters
- ❖ study of period resonance

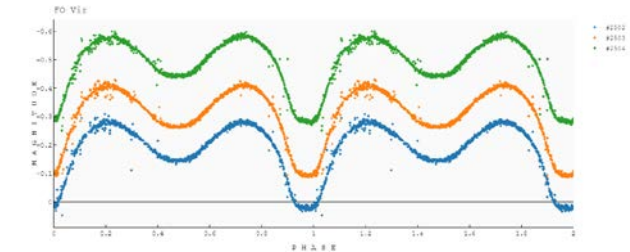
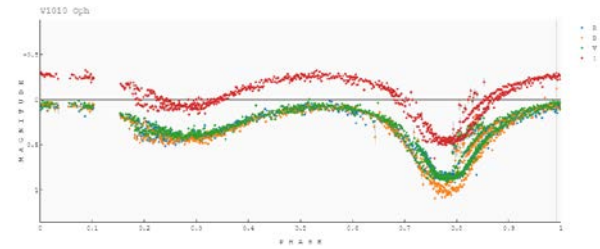


# Near contact binaries

Shaw (1990): two subclasses

**V1010 Oph**: primary components near the RL; show asymmetrical LCs

**FO Vir**: secondary components near the RL; do not show asymmetrical LCs



## Importance:

- most of NCBs have A or F sp. type primary components and 1 or 2 later sp. type secondary => opportunity to investigate the system with solar-like stars.
- marginal contact => laboratory to study mass transfer
- large temperature difference between components while contact in geometry => test of TRO, information about the formation of the common envelope
- unclear evolutionary stage

## Tasks:

- analyse of known NCBs
- search for new NCBs (in clusters)
- compare evolutionary status a unveil the stage

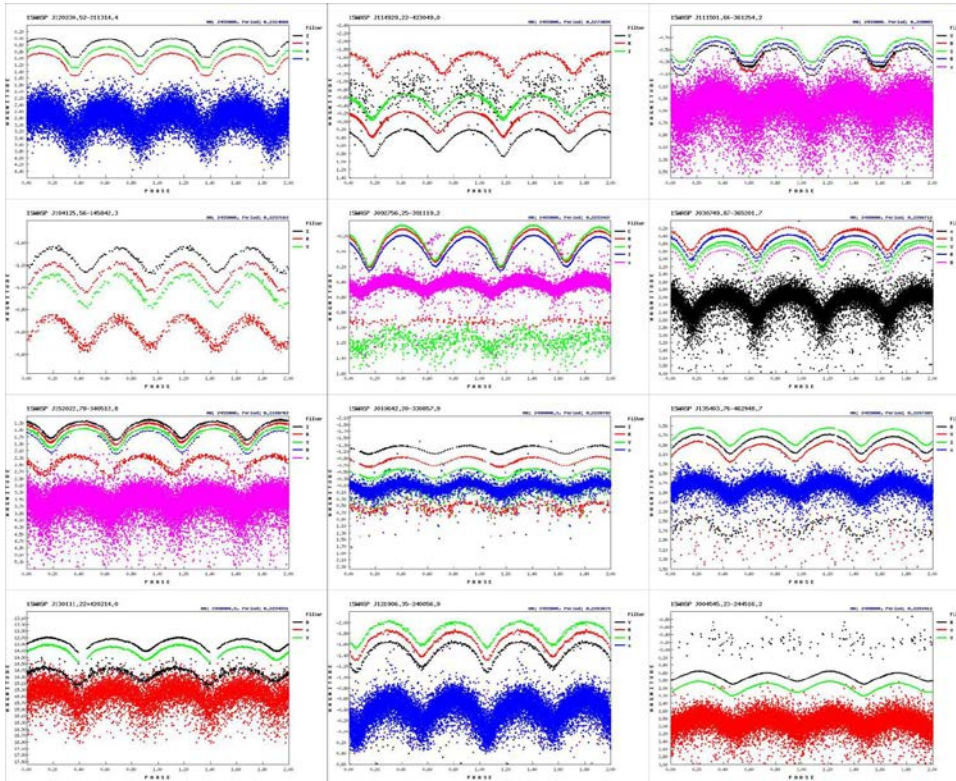
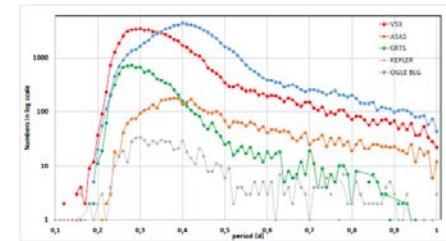
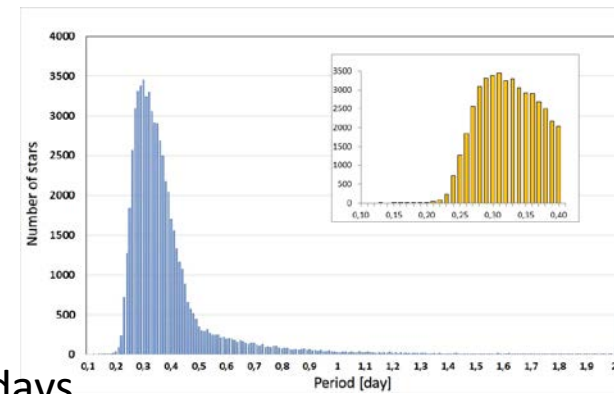
# Close binaries at period limit

EW-type contact binaries – 2 cool dwarfs with common convective envelope

period distribution of EWs => short-period limit around 0.2 days

why?

two rival theories Stepien (2006,2011) x Jiang+ (2013)

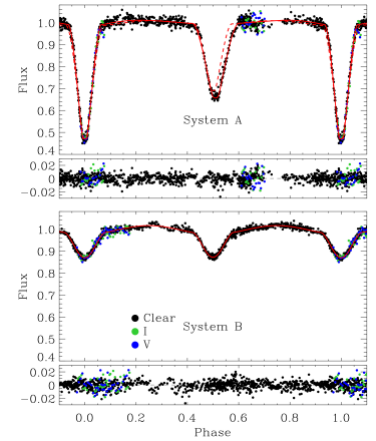
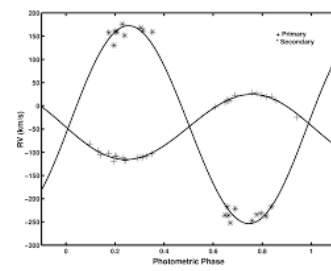


Tasks:

- analysis of collected observations
- add new phot.+spectr. observations
- determination of evolutionary status
- check the theories

All three areas of research offer:

- observations – photometric, spectroscopic
- collecting data from surveys, open sources
- analyse of data
- theoretical modelling



It depends on student interest which branch he/she prefers ☺

We are looking for collaboration!

