

ASTROPHYSICS

T Tauri stars in the Cepheus and Ophiuchus complexes

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study form: full time

T Tauri type stars are young stars located near large molecular clouds. These objects are so-called pre-main sequence stars in the process of contracting to the main sequence. They also show optical variability and strong chromospheric lines. The main aims of the thesis are:

- analyze long-term photometry of selected stars in both complexes obtained by SuperWasp and NSVS projects. If any strong periods and their changes will be detected, other photometric monitoring will be started
- obtain and analyze spectroscopic observations and reveal binary nature of objects.

The Virtual Observatory for small telescopes

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study form: full time

Annotation: The Virtual Observatory (VO) is a network of different data archives and services that work together with software tools, and provide free access to astronomical data for the wide astronomical community. The main aims of the thesis are:

- to create platform for the photometric and spectroscopic data archiving from small telescopes (diameter up to 1m) in Slovakia and all around the world
- to develop tools for online analysis of data obtained from different sources

Rossiter-Mc Loughlin effect: tool to measure stellar obliquity.

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Annotation: Rossiter Mc Loughlin (RM) effect is an essential modeling tool to determine orbital plane-spin axis misalignment in double stars and exoplanetary systems. The effect changes the observed radial velocity of a star when it is eclipsed. In rapid rotators the orbital plane-spin axis misalignment can directly be inferred from the line-profile changes. The orbital plane-spin axis misalignment records evolutionary history and strongly affects the apsidal-motion rate of eccentric systems. The RM effect will be studied using medium and high-resolution échelle spectroscopy of selected eclipsing binaries during eclipses. The data will be obtained with 60 and 130cm telescopes of the Astronomical institute of the Slovak Academy of Sciences.