

FDITE89 Binary and Multiple Star Systems

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Description:

Although it covers all aspects of the topic, the course focuses primarily on occultation systems, since they provide the most information about the short- and long-term processes occurring in such systems. Special attention is also paid to triple and multiple systems, the research of which has only recently gained momentum, thanks to the era of photometric space telescopes, and is still considered a fairly fresh, "hot field".

Topics:

- Historical overview
- Binary dynamics, orbit determination
- Roche model, mass transfer
- Measurement and investigation methods
- Description of brightness and spectral changes: binary star models
- Determination of masses and absolute sizes
- Perturbations in the presence of a third body
- Wide systems: circularization, tidal effects, apsidal motion
- Close systems: the effect of binary on the evolution of stars
- Interacting systems: shared-envelope binaries, cataclysmic variables, and other species
- Direct and indirect methods for surface mapping of binary stars
- Physical variables in binary stars
- "Binary astronomy" in the age of space telescopes: multiple systems

Literature:

- * Hilditch, R. W.: „An introduction to close binary stars”
Cambridge University Press, 2001
- * Benacquista, M.: „An introduction to the evolution of single and binary stars”
Undergraduate Lecture Notes in Physics series, Springer, 2013.
- * Kallrath, J., Milone, E.: „Eclipsing binary stars: modeling and analysis”
Springer, 200
- * PHOEBE (PHysics Of Eclipsing BinariEs) program
<http://phoebe-project.org>