SH2403 Astrophysics, Advanced Course 6.0 credits

Astrofysik, fortsättningskurs

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for SH2403 valid from Autumn 2015

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Physics

Specific prerequisites

Recommended prerequisites: Astrophysics equivalent to SH2204 and Mathematical methods in physics.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completing the course the student should be able to:

- Describe the most important radiation processes in the Universe.
- Apply the theories for the production of continuum spectra to calculate the most important properties of the emitting object/medium from observed spectra.
- Explain the main points of accretion theory and use the theory to solve problems for relevant astrophysical phenomena.
- Describe Compact objects (black holes and neutron stars) and phenomena related to these objects (e.g., active galactic nuclei, pulsars and gamma-ray bursts).
- Apply the learning outcomes above to critically evaluate different ways of using high-energy observations to study the properties of compact objects.

Course contents

The course gives a solid foundation in astrophysics, with particular emphasis on high-energy astrophysics. The following topics are covered:

- Continuum spectra: Compton emission, Synchrotron emission and Brehmsstrahlung.
- Accretion onto neutron stars and black holes
- Astrophysical applications of the theory of relativity
- Compact objects (black holes and neutron stars) and phenomena related to these objects (e.g., active galactic nuclei, pulsars and gamma-ray bursts), with particular focus on relevant radiation processes.

Course literature

Lecture notes and hand outs.

Examination

- INL1 - Exercises, 2.0 credits, grading scale: P, F
- PRO1 - Project Work, 4.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Hand-in exercises (2hp)

Project work (4 hp)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.