

Internal structure and rotation of the Sun from different observations

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Course Outline

In the lecture the basic information about internal structure of the Sun will be presented as well as its dynamics such as differential rotation and solar activity will be discussed from theoretical and observational points of view.

The study of the internal structure of the Sun can be performed by two direct methods: neutrino astronomy and helioseismology.

The review of the main results about the distributions of the density, pressure, temperature, chemical composition inside the Sun, nuclear energy generation rate in the core will be given to provide the necessary base for the understanding of modern state of our knowledge about the nearest star to the Earth.

Variability of the Sun will be discussed. Solar activity cyclicity and solar dynamo models will be shortly presented as they are seen in different observational data. Differential rotation as a function of latitude and solar depth was studied by helioseismological methods and by other methods.

Differential rotational rate of the magnetic field and its temporal dependence has been evidenced at different latitudes through activity cycles. The velocity of the meridional flows of the magnetic field was calculated. The rotation of the plasma will be compared to the rotation rate of the large scale magnetic structures on the solar surface as well as in the bottom of the convective envelope.

Prospects of future research of solar dynamics will be discussed.