STELLAR ECOSPHERES

Summary

The article reviews the theory of stellar ecospheres (also called habitable zones), emphasizing the following points:

(1) The theory of habitable zones helps to choose appropriate targets for planned missions which will look for biosignatures in extrasolar planetary systems.

(2) The location of habitable-zone boundaries depends not only on luminosity and effective temperature of the star, but also on the particular planet's model we adopt.

(3) Hydrogen-burning is the only evolutionary phase in which stars can create and maintain conditions suitable for the emergence and development of life.

(4) Search for extrasolar biospheres should be focused on stars with masses not larger than the solar mass.

(5) Even if the planet orbits a solar-like star within its ecosphere, it may easily happen that conditions appropriate for life to emerge on its surface will not be maintained long enough. This is because the long-term evolution of planet's climate depends on a multitude of very complicated processes which must be rather carefully balanced.