ON GRAVITATIONAL INSTABILITY OF THE SUN's PROTOPLANETARY DISK.

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Nowdays, there are two basic approaches to the planet formation in the solar system. One of them, widely recognized is the theory by Shmidt and Safronov that explains the formation of planets by means of accumulation of large solid parts and small particles. The models alternative to the solid accumulation theory comes from the hypothesys of formation gaseous protoplanet with subsequent transformation of these protoplanets into the corresponding planets. In the framework of the alternative models, the protoplanetary disk must be assumed to be gravitational unstable at the initial stage of its evolution.

The purpose of our research, the results of which are presented in this paper is to study large-scale gravitational instabilities at the the initial stage of the evolution of the Sun's protoplanetary disk.

We have carried out analisys of the following issues.

- Origin of large-scale gravitational instabilities in the infinite homogeneous isotropic gaseous medium for both planar and radial initial density perturbations [1].
- Unperturbed stationary equilibrium state of the protoplanetary disk [2];
- Unperturbed stationary protoplanetary rings [2];
- Derivation of dispersion equations for the protoplanetary disk [3];
- Numerical modeling of the protoplanetary disk evolution at the initial stage [4, 5].

The results obtained demonstrate that with a high degree of probability the Sun's protoplanetary disk was gravitationally unstable at the initial the stage of evolution with regard to large-scale perturbations with a wavelength comparable to the distance between planets.

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