COMPUTER SIMULATION OF INITIAL STAGES CONDITIONS OF CHEMICAL EVOLUTION IN PROTOPLANETARY DISK

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According to astrocatalysis hypothesis, abiogenous synthesis of organic substances most probably took place on protoplanetary stage of evolution of the Solar System. Mathematical simulation of astrocatalytic processes in protoplanetary disks needs correct description medium composed of interacting components of gas and solid phase. The work is aimed at study of bicomponent system: gas and particles with several stages of protoplanetary formation.

We made series of calculation were we used diverse initial distributions of density, pressure and velocity for gas and for particles, and different polytropic value. In particular the purpose of the variation of initial conditions was to choose satisfactory initial density and velocity distributions, and pressure adjusted with them. Analysis of modification of rotation curve and density profile was made. Also we studied how supplement of particles with different initial distribution influence to the gas dynamics. Separately we research transformation of velocity at the gas-particles border.

Computation results confirm that obtained realization of mathematical model can be used for solving astrophysics and astrocatalysis problems. Particularly we used this code for investigating evolution of bicomponent gas in the selfgravitating rotating gas cloud. As a consequence we calculated conditions for chemical evolution at the gas stage of the disk.