IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Gravity and Fundamental Physics (1)

Author: Prof. Boris Rybakin
Scientific research Institute for System Studies, Russian Academy of Sciences (RAS), Russian Federation, rybakin@vip.niisi.ru

Prof.Dr. Valerii Goriachev
Russian Federation, gdv.vdg@yandex.ru
Ms. Elena Mikhalchenko
Scientific Research Institute for System Analysis, Russian Academy of Sciences (RAS), Russian Federation, Vi-Velena@rambler.ru
Mr. Lyuben Stamov
Scientific Research Institute for System Analysis, Russian Academy of Sciences (RAS), Russian Federation, lyubens@mail.ru
Mr. Dmitriy Pestov
Scientific Research Institute for System Analysis, Russian Academy of Sciences (RAS), Russian Federation, dmitr-ey94@mail.ru
Ms. Evgeniya Skryleva
Lomonosov Moscow State University, Russian Federation, jennyne@yandex.ru

NUMERICAL SIMULATION OF DIFFERENT COLLISION SCENARIOS OF INTERSTELLAR MOLECULAR CLOUDS

Abstract

Results are obtained on the simulation of supersonic turbulization of the substance of rotating molecular clouds, the formation of filamentous and film structures that arise during their collision. The process of formation of regions of high density, or protonuclear cells, which, under certain conditions, can become the nuclei of new stars, has been studied. Collisions of molecular clouds with each other are one of the main mechanisms for the formation of super dense regions (clumps) or protostars that arise in areas of strong compression. The onset of supersonic turbulization of the molecular cloud substance is investigated for various scenarios of interaction on the formed dense clumps and filamentary structures. To simulate the fine structure that occurs during impact interaction, the authors created a computer code based on a high-resolution difference scheme in a three-dimensional setting. Parallel algorithms were used for the calculations. The freestream structure was simulated on high-resolution grids containing several billion nodes. For processing and presentation of large amounts of digital data and detailed visualization of the results, an author's visualization program was created.

Russian basic research foundation (project code 19-29-09070) is acknowledged for financial support.