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Novel Kinetic 3DMHD Algorithm for High Performance Parallel Computing Systems

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The impressive progress of the kinetic schemes in the solution of gas dynamics problems and the development of effective parallel algorithms for modern high performance parallel computing systems led to the development of advanced methods for the solution of the magnetohydrodynamics problem in the important area of plasma physics. The novel feature of the method is the formulation of the complex Boltzmann-like distribution function of kinetic method with the implementation of electromagnetic interaction terms. The numerical method is based on the explicit schemes. Due to logical simplicity and its efficiency, the algorithm is easily adapted to modern high performance parallel computer systems including hybrid computing systems with graphic processors.

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