LATTICE BOLTZMANN APPROACH TO MULTIPHASE FLUIDS USING MASSIVELY PARALLEL SYSTEMS QUADRATURES

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The phase separation process in isothermal fluid systems is investigated using a third - order Lattice Boltzmann model. The model is based on the Gauss - Hermite expansion of the distribution function, followed by the discretization of the momentum space. Both the two - dimensional (2D) and the three - dimensional (3D) versions of this model are off - lattice. The corner transport upwind scheme was used to solve the set of hyperbolic equations that describe the evolution of the fluid system. The dynamics of phase separation in large - scale systems was investigated using the Minkowski functionals. The computer simulations were performed on both IBM Blue Gene / P system (with 1024 quad core CPUs) at West University of Timisoara and GPU cluster (with 8 Nvidia Tesla M2090 graphics cards, having 512 cores each) at the Romanian Academy - Timisoara Branch.

Acknowledgments: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS - UEFISCDI, project number PN-ID-PCE-2011-3-0516.

Keywords: Lattice Boltzmann, phase separation, parallel computing.

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