

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Interacting many-body simulations including contacts using graphics processing units (GPU)** TOBIAS KRAMER, University of Regensburg, Germany — Already the solution of the interacting classical many-body problem is difficult to achieve, since the integration of the equations of motions couples all positions of the particles contained in the system. Transport calculations require to include the contacts within the simulation and to study the effect of interactions there. Classical and quantum-mechanical equations of motions can be related by the time-dependent variational principle for Coulombic interacting electrons in a magnetic field [1]. Interacting systems require to carefully consider the questions of self-consistency. The emergence of an mean-field potential out of a large (10000 electrons!) many-body calculation is shown in [2]. The calculation is only possible due to our usage of graphics processing units, which are ideal tools to study interacting systems.

[1] Two interacting electrons in a magnetic field: comparison of semiclassical, quantum, and variational solutions, T. Kramer, AIP in press (2010), arxiv:1009.6051

[2] Self-consistent calculation of electric potentials in Hall devices, T. Kramer, V. Krueckl, E. Heller, and R. Parrott Phys. Rev. B, 81, 205306 (2010)

Tobias Kramer  
University of Regensburg, Germany

Date submitted: 23 Dec 2010

Electronic form version 1.4