Abstract Submitted
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GPU accelerated self-consistent calculation of the Hall potential in semiconductor devices[1] TOBIAS KRAMER, Institute for Theoretical Physics, University of Regensburg, VIKTOR KRUECKL, CHRISTOPH KREISBECK, University of Regensburg, ERIC J. HELLER, ROBERT E. PARROTT, Harvard University — The usage of teraFLOPS graphics processing units allows us to run efficiently classical many-body simulation of semiconductor devices at realistic electron densities. As an application, we study the necessary conditions for the formation of the Hall potential: (i) Ohmic contacts with metallic reservoirs, (ii) electron-electron interactions, and (iii) confinement to a finite system. By propagating thousands of interacting electrons over million time-steps we capture the build-up of the self-consistent potential, which resembles results obtained by conformal-mapping methods. As shown by a microscopic model of the current injection, the Hall effect is linked to specific boundary conditions at the particle reservoirs. References: http://www.quantumdynamics.de/publications.html

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