Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Screening properties and phase transitions in unconventional plasmas for Ising-type quantum Hall states[1] EGIL V. HERLAND, Norwegian University of Science and Technology, EGOR BABAEV, UMass Amherst and KTH Stockholm, PARSA BONDERSON, Microsoft Research, Station Q, VICTOR GURARIE, University of Colorado, Boulder, CHETAN NAYAK, Microsoft Research, Station Q and University of California, Santa Barbara, ASLE SUDBO, Norwegian University of Science and Technology — Utilizing large-scale Monte-Carlo simulations, we investigate an unconventional two-component classical plasma in two dimensions that interacts with two different Coulomb interactions. This plasma controls the behavior of the norms and overlaps of the quantum-mechanical wavefunctions of Ising-type quantum Hall states. It also relates to a model for a rotating two-component Bose-Einstein condensate with an Andreev-Bashkin drag interaction. The plasma differs fundamentally from that which is associated with the two-dimensional XY model and Abelian fractional quantum Hall states. We find that this unconventional plasma undergoes a Berezinskii-Kosterlitz-Thouless phase transition from an insulator to a metal and that the parameter values corresponding to Ising-type quantum Hall states lie on the metallic side of this transition. This result verifies the required properties of the unconventional plasma used to demonstrate that Ising-type quantum Hall states possess quasiparticles with non-Abelian braiding statistics.

[1]Supported by the Knut and Alice Wallenberg Foundation, NSF grants No. DMR-0955902, No. PHY-0904017, DARPA QuEST program, NRC Grant No. 205591/V30 (FRINAT).

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Date submitted: 10 Nov 2011 Electronic form version 1.4