Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Anisotropic quantum Hall liquids - a small system Monte Carlo study[1] ORION CIFTJA, BRITTNEY CORNELIUS, KESHA BROWN, EMERY TAYLOR, Department of Physics, Prairie View A&M University, Prairie View, Texas 77446, USA — While no fractional quantum Hall effect states were expected to stabilize in the second excited Landau level, the discovery of extreme magneto-transport anisotropy around filling factor 9/2 was found quite surprising. A unidirectional charge density wave is a plausible candidate for the anisotropic states as indicated by the earlier theoretical work. An alternative approach that would be consistent with observed experimental facts would view the onset of anisotropy as signature of a phase transition from an isotropic to an anisotropic liquid crystalline phase. In this work we present a small-system Monte Carlo study for anisotropic quantum Hall liquid states observed at filling factor 9/2. The anisotropic electronic liquid phases are described by a broken rotational symmetry wave function and electrons interact with Landau level-projected interaction potentials. Our small-system Monte Carlo study indicates that such an anisotropic liquid crystalline quantum Hall phase with broken rotational symmetry is energetically favored relative to an isotropic liquid one.

[1]This research was supported in part by NSF Grant No. DMR-0804568.

Orion Ciftja
Department of Physics, Prairie View A&M University,
Prairie View, Texas 77446, USA

Date submitted: 22 Nov 2010 Electronic form version 1.4