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Anisotropy of electronic quantum Hall phases at filling factor 9/2[1]

ORION CIFTJA, Department of Physics, Prairie View A&M University, Prairie View, Texas 77446, USA — Strongly correlated two-dimensional electronic systems in a perpendicular magnetic field develop very pronounced magneto-transport anisotropies at particular filling factors of high Landau levels. The most robust anisotropic phases generally occur around half filling of the upper Landau levels. In this study we focus on the nature of anisotropic quantum Hall phases observed around filling factor 9/2. Despite the efforts, there are many questions that still remain about the microscopic origin of anisotropy and the physical mechanism of stabilization of anisotropic phases. In this study we view the appearance of anisotropy as signature of a phase transition from an isotropic phase to an anisotropic liquid crystalline phase. We study the stabilization of anisotropic phases in this regime by means of a microscopic wave function with no rotational symmetry intrinsically containing nematic order. Monte Carlo results using an effectively projected interaction potential indicate the stabilization of such an anisotropic liquid crystalline states at this filling factor.

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