Incompressibility estimates for the Laughlin phase

Nicolas Rougerie

Abstract: The fractional quantum Hall effect is one of the most intriguing phenomena of condensed matter physics, made manifest by the transport properties of 2D electron gases in high magnetic fields. Laughlin's variational wave function, proposed to approximate the ground state of such a system, forms the basis of much of our current understanding of this phenomenon but many of its fundamental properties are poorly understood yet. In this talk we will investigate a model for the response of the Laughlin state to variations of an external potential. This leads to a family of variational problems of a new type. Our main results are rigorous energy estimates demonstrating a strong rigidity of the response of the Laughlin state to the external potential.

Joint work with Jakob Yngvason.