Rigidity of the Laughlin liquid

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Abstract: The Laughlin state is a well-educated ansatz for the ground state of 2D particles subjected to large magnetic fields and strong interactions. The two latter effects conspire to generate strong and very specific correlations between particles.

We shall discuss mathematically the rigidity these correlations display in their response to perturbations. This is a crucial ingredient in the Fractional Quantum Hall Effect, where the Laughlin state is the cornerstone of our current theoretical understanding. The main message is that trapping and disorder potentials can be taken into account by generating uncorrelated quasi-particles (Laughlin quasi-holes) on top of the Laughlin state.

These quasi-particles are remarkable for carrying fractional charge. If time allows, we shall also explain that they carry fractional statistics.

Joint works with Elliott H. Lieb and Jakob Yngvason (and Douglas Lundholm if time allows).