



Anatomy Of The Fractional Quantum Hall States

Nicolas Regnault (nicolas.regnault@lpa.ens.fr)

Laboratoire Pierre Aigrain, Ecole Normale Supérieure, CNRS

Understanding of numerous phenomena in physics or chemistry are based on the underlying fermionic or bosonic statistics. While statistics beyond these two have been predicted or more than twenty years, the experimental evidences of fractional or non-abelian statistics would be a major breakthrough.

Experiments based on the fractional quantum Hall effect are on the verge of settling this question.

We will show the theoretical evidences that indicate excitations of some fractional quantum Hall phases may obey such exotic statistics. While a large part of these arguments are based on numerical calculations, we will point out limitations of such approach. We will try to describe some proposals to differentiate phases from finite size calculations. The complete information of a state lies in its symmetric monomial decomposition, but handling such huge amount of data has to be done in a clever way. The so-called entanglement spectra provide such technique. We will point out that they can go beyond overlap calculations to probe quantum phases.