ICTS Seminar

Title : Equilibration of fractional quantum Hall edge modes

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Date : Tuesday, August 10, 2021

Time : 11:00 am (IST)

Abstract : Integer quantum Hall (IQH) states are well understood in terms of quantization of non-interacting electrons. In IQH system, dissipation-less transport occurs through protected integer charge modes with conductance of e^2/h. However, in strong Coulomb interaction regime, nucleation of dominant fractional quantum Hall (FQH) gaps at filling ν = 1/3 and 2/3 gives rise to incompressible strips around the smooth boundary of IQH system. As a consequence, edge states of IQH system become fractionalized into three downstream charge modes of conductance $e^2/3h$ each. In this talk we experimentally demonstrate that ν = 1 IQH edge state is composed of three robust downstream fractional 1/3 charge modes. By selectively exciting with small voltage and detecting current in the fractional modes, we observe two sets of FQH plateaus 1/9, 2/9, 4/9 and 1/6, 1/3, 2/3 at low and high magnetic field ends of the ν = 1 quantum Hall plateau, respectively. The findings are explained by magnetic field dependent equilibration of three FQH edge modes with conductance $e^2/3h$ arising from edge reconstruction. The results reveal a remarkable enhancement of the equilibration lengths of the FQH edge modes with increasing magnetic field.

Venue : Please click on the below link to join the meeting

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