

ICTS Condensed Matter seminar

Title : Looking for non-Abelian braiding in quantum Hall systems

Speaker : Kirill Shtengel (University of California)

Date : Wednesday, 6th March, 2024

Time : 11:00 AM (IST)

Abstract : Non-Abelian anyons are unusual quasiparticles whose many-body wave function doesn't just acquire a phase upon their exchange but changes in a more profound way. These anyons are widely sought for the exotic fundamental physics they harbour as well as for their possible applications for quantum information processing. Despite strong theoretical expectations of their existence in certain quantum Hall states, most prominently at the filling factor $\nu=5/2$, unambiguously establishing their defining property, the non-Abelian braiding statistics, has been slow going.

In this talk I will focus on the recent experiments measuring resistance oscillations as a function of magnetic field in Fabry-Pérot interferometers using new high purity heterostructures at filling fractions $\nu=5/2$ and $7/2$. I will discuss possible theoretical interpretations of the observed oscillations and will argue that these experimental findings strongly support the non-Abelian nature of quasiparticles in both states. These experiments also provide an insight into the fermion parity, a topological quantum number associated with an even number of non-Abelian quasiparticles. The remarkable observed stability of this quantum number strengthens the case for potential utility of these systems for topological quantum computation.

[Ref: Willett et al. Phys. Rev. X 13, 011028 (2023)]

Venue : **Offline:** Emmy Noether Seminar Room

Online: Please click the below link to join the seminar.

<https://icts-res-in.zoom.us/j/92385151765?pwd=RIAwZ1JsbnhQzJaTFpoRWNQVThDdz09>

Meeting ID: 923 8515 1765

Passcode: 060607