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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS String Seminar

Title : Magnetized Bounds for Conformal Field Theories

Speaker : Biswajit Sahoo (Kings College London, England)

Date : Friday, 01 August 2025

Time : 3:30 PM (IST)

Abstract : In this talk, I will describe how parity-preserving three-dimensional conformal field theories (CFTs) with a global $U(1)$ symmetry behave under strong background magnetic fields. Assuming that the magnetic field drives the CFT into a gapped phase, I will develop an effective field theory (EFT) framework that captures the low-energy dynamics up to four-derivative order, which I will use to compute one- and two-point functions of conserved currents and stress-energy tensors. By applying dispersive sum rules and positivity constraints on spectral densities developed for Lorentz symmetry-breaking theories, I will derive bounds on the Wilson coefficients of the EFT, leading to universal predictions for magnetic susceptibility, transport coefficients, and the scaling dimensions of background monopole operators. I will illustrate these results with explicit examples, including free bosonic and fermionic theories, as well as holographic models.

Venue : Emmy Noether Seminar Room

Zoom Link: <https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09>

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