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Physical Sciences Seminar

Hawking-Unruh effect and quasinormal decay in quantum Hall effect

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Hawking radiation and Unruh effect are one of the most fascinating and puzzling consequences of the interplay between quantum mechanics and relativity. In the simplest setting of Unurh effect, an accelerating observer perceives the Minkowski vacuum as a thermal bath. In the context of black holes, this is manifest as the Hawking radiation. This puzzling thermality, arises from a relation between symmetry operation that preserves the causal structure of the spacetime(The Lorentz boost) and the Hamiltonian that generates time translations in the accelerating(Rindler) space. In this talk, I show that this 'Rindler Hamiltonian' has a structural parallel in the quantum Hall system with an applied saddle potential, which is an interesting system from the condensed matter perspective itself. All of this physics ultimately boils down to studying the quantum mechanical scattering off an inverted harmonic oscillator potential. This also uncovers novel time-decaying resonant modes(Quasinormal modes) in the quantum Hall set up. Recent LIGO measurements actually observed the quasinormal modes from a black hole merger. Thus, we show parallels of black hole phenomena in a quantum Hall system and also uncover novel features in the quantum Hall system.

Tuesday, February 26, 2019 02:00pm - 03:00pm

IST Austria Campus Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

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