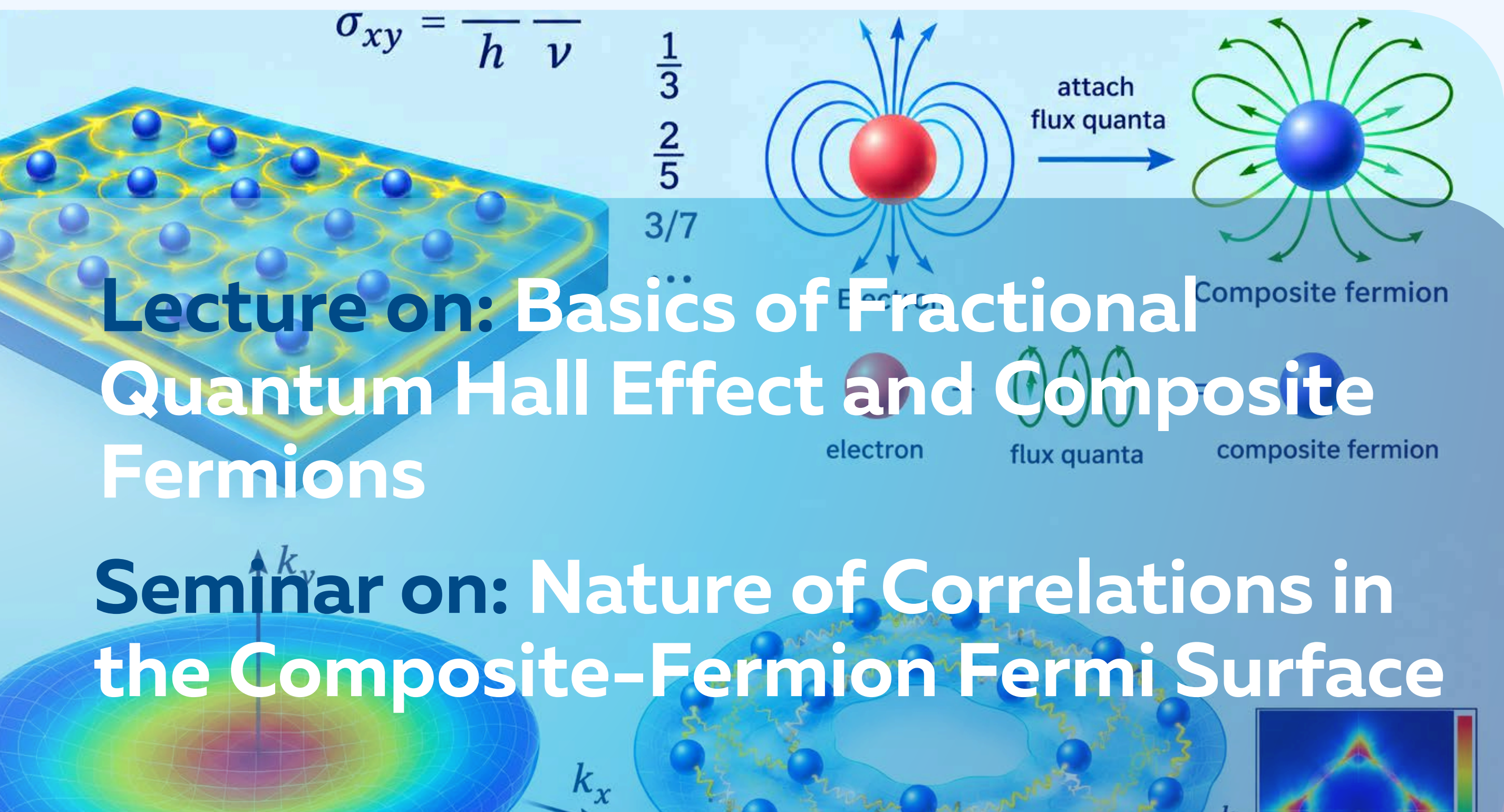




Lecture on: Basics of Fractional Quantum Hall Effect and Composite Fermions

Seminar on: Nature of Correlations in the Composite-Fermion Fermi Surface

October 12-13
(Lecture - Seminar),
2026
11:00 AM

FB-382 (Prof. Amal Kumar
Raychaudhuri Seminar Room)



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Abstract

The composite Fermi liquid is a primary example of a strongly correlated gapless phase in the quantum Hall effect. An effective field theory approach has proposed that the composite fermions form a non-Fermi liquid with no stable quasiparticles. In this proposal, the mechanism is the interaction mediated by the Landau-damped emergent gauge field. Landau damping predicts a non-analytic static structure factor that scales as $q^3 \log(q_0/q)$ at long wavelengths. We study this question with microscopic approaches, using model wavefunctions on the sphere and many-body ground states on the cylinder. We find no logarithmic correction, which suggests that Landau damping is absent. Instead, the static structure factor is captured by a simpler model of non-interacting composite fermions, each carrying an electric dipole moment proportional to its momentum. I will discuss possible theoretical explanations for these findings. I will also present preliminary results from a new perturbative method on model wavefunctions that can probe the possible non-Fermi-liquid physics.

All are Cordially Invited



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