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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Condensed Matter and Statistical Physics Seminar

Title : Time-dependent magnetic fields and the quantum Hall effect

Speaker : T.R. Govindarajan (IMSc, Chennai.)

Date : Friday , 04 September 2026

Time : 03:45 PM (IST)

Abstract : Ermakov has shown how the solution to the classical harmonic oscillator in one spatial dimension with general time-dependent frequency can be reduced to the time-independent case and an associated nonlinear ordinary differential equation, an analysis which has been applied to the Schrödinger equation as well. We extend this analysis to the Landau problem of a charged particle in a uniform magnetic field in two dimensions and construct the $\{\text{generalized}\}$ Laughlin wave functions for the case when the magnetic field is time-dependent. We also work out the dynamics of density fluctuations (the Girvin, MacDonald, Platzman or GMP mode) and argue that it is possible to tune the frequency of the magnetic field to obtain a compressible droplet of fermions. We also analyze the dynamics of the edge modes of the droplet for the integer Hall effect.

Venue : Emmy Noether Seminar Room

Zoom Meeting: <https://icts-res-in.zoom.us/j/93951176646?pwd=RZbeIJcDLMifZ8nYYZ3p5MraZq6Qwj.1>

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