

Abstracts

Dimitri Yafaev (Univ. Renne 1)

Title: On spectral properties of translationally invariant magnetic Schrödinger operators

Abstract: We consider a class of translationally invariant magnetic fields such that the corresponding potential has a constant direction. Our goal is to study basic spectral properties of the Schrödinger operator \mathbf{H} with such a potential. In particular, we show that the spectrum of \mathbf{H} is absolutely continuous and we find its location. Then we study the long-time behaviour of solutions $\exp(-i\mathbf{H}t)f$ of the time dependent Schrödinger equation. It turns out that a quantum particle remains localized in the plane orthogonal to the direction of the potential. Its propagation in this direction is determined by group velocities. It is to a some extent similar to an evolution of a one-dimensional free particle but “exits” to $+\infty$ and $-\infty$ in the direction of the potential might be essentially different.

Arne Jensen (Aarborg Univ.)

Title: Perturbation of an eigenvalue near a threshold and non-exponential decay laws (joint work with V. Dinu and G. Nenciu, Bucharest, Romania)

Abstract: We consider a two channel model of the form

$$H_\varepsilon = \begin{bmatrix} H_{\text{op}} & 0 \\ 0 & E_0 \end{bmatrix} + \varepsilon \begin{bmatrix} 0 & W_{12} \\ W_{21} & 0 \end{bmatrix} \quad \text{on } \mathcal{H} = \mathcal{H}_{\text{op}} \oplus \mathbf{C}.$$

The operator H_{op} is assumed to have the properties of a Schrödinger operator in odd dimensions, with a threshold at zero. As the energy parameter E_0 is tuned past the threshold, we consider the survival probability $|\langle \Psi_0, e^{-itH_\varepsilon} \Psi_0 \rangle|^2$, where Ψ_0 is the eigenfunction corresponding to eigenvalue E_0 for $\varepsilon = 0$. We find non-exponential decay laws for ε small and E_0 close to zero, provided that the resolvent of H_{op} is not at least Lipschitz continuous at the threshold zero.

Elliott Lieb (Princeton Univ.)

Title: Some extensions of Lieb-Thirring inequalities for eigenvalues of the Schroedinger operator (joint work with R. Frank, A. Laptev and R. Seiringer)

Abstract: The LT inequalities bound sums of negative eigenvalues of Schroedinger operators by certain integrals of the potential energy function. Extensions of these inequalities to matrix-valued potentials and to complex-valued potentials will be described.

Dongho Chae (Sungkyunkwan Univ.)

Title: Liouville type of theorems for the Euler equations in \mathbb{R}^N

Abstract: In this lecture we discuss rather surprizing(to me), but elementary discovery abot solutions of the incompressible Euler equations in \mathbb{R}^N . If the pressure of a weak solution of the the Euler equations(and Navier-Stokes equations) satisfies suitable integrability and the positivity condition of integration, then the solution will be shown to be trivial(zero solution). Extensions to the Hardy spaces and the case of weighted integrations are also discussed.