Séminaire : Problèmes spectraux en physique mathématique

Les séminaires ont lieu un lundi par mois, à l'**Institut Henri Poincaré**, 11 rue Pierre et Marie Curie, 75005 Paris.

Programme du lundi 2 juin 2012, en **salle 201 (2e étage)**

– 11h15 - 12h15 : **Søren Fournais** (Aarhus)
  Relativistic Scott correction in self-generated magnetic fields.

  We consider a large neutral molecule with total nuclear charge Z in a model with self-generated classical magnetic field and where the kinetic energy of the electrons is treated relativistically. To ensure stability, we assume that $Z\alpha < 2/\pi$, where α denotes the fine structure constant. We are interested in the ground state energy in the simultaneous limit $Z \to \infty$, $\alpha \to 0$ such that $\kappa = Z\alpha$ is fixed. The leading term in the energy asymptotics is independent of κ, it is given by the Thomas-Fermi energy of order $Z^{7/3}$ and it is unchanged by including the self-generated magnetic field. We prove the first correction term to this energy, the so-called Scott correction of the form $S(\alpha Z)Z^2$. This extends the result of Solovej–Sorensen–Spitzer on the Scott correction for relativistic molecules to include a self-generated magnetic field. Furthermore, we show that the corresponding Scott correction function S, is unchanged by including a magnetic field. We also prove new Lieb-Thirring inequalities for the relativistic kinetic energy with magnetic fields.
  This is joint work with László Erdős and Jan Philip Solovej.

– 14h - 15h : **Christophe Cheverry** (Rennes)
  Optique géométrique et analyse semi-classique appliquées à la propagation d'ondes océaniques.

  Deux grands types d'ondes se propagent dans les océans : les ondes de Poincaré et les ondes de Rossby. Leur description sur des temps longs (plusieurs mois) fait apparaître de la dispersion pour les premières et des trajectoires captées pour les secondes. L'objectif de cet exposé est de présenter des travaux obtenus en collaboration avec I. Gallagher, T. Paul et L. Saint-Raymond, permettant de rendre compte de ces deux phénomènes via des méthodes issues de l'optique géométrique et de l'analyse semi-classique.

– 15h15 - 16h15 : **Wojciech De Roeck** (Heidelberg)
  Quantum Brownian motion.

  This talk concerns the rigorous derivation of diffusion, thermalization and decoherence in simple quantum systems : a spin or a particle interacting with phonons. Our approach takes the Markovian description (Pauli master equation or quantum Boltzmann equation) as a starting point. However, since such a Markovian description is only valid in a certain scaling limit (vanishing coupling constant and long time), we develop an expansion around the Markovian description to control the behavior at finite coupling constant. This expansion consists of a controlled renormalization group flow with Brownian motion as the fixed-point solution.

The long-range nature of the velocity-velocity correlation function is an example of a physical quantity that is not described correctly within the Markovian description (cfr. Alder-Wainwright), but that is captured by our approach.

Pour tout renseignement, contacter les organisateurs
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