Israel Michael Sigal, Department of Mathematics, University of Toronto

Title: Partial differential equations of quantum physics

Abstract: The goal of the talk is to give an informal overview of the active area of partial differential equations of quantum physics. I will indicate very briefly some of the recent results. I will begin with the key many-body Sch\"odinger equation and then proceed to the effective nonlinear equations: the Hartree, Hartree-Fock, Hartree-Fock-Bogolubov and Bogolubov-de Gennes equations. The latter two describe quantum fluids: superfluids and superconductors. If time permits I will say a few words about the Ginzburg-Landau and Yang-Mills-Higgs equations and their relations to geometry.

The talk is based on joint work with Li Chen and with V. Bach, S. Breteaux, Th. Chen and J. Fr\"ohlich. I might mention results with T. Tsaneteas and with D. Chouchkov, N. Ercolani and S. Rayan.