

# The Gross-Pitaevskii hierarchy on periodic domains

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**Abstract:** The Gross-Pitavskii hierarchy is a system of infinitely many linear PDEs which occurs in the derivation of the nonlinear Schrodinger equation from the dynamics of many-body quantum systems. We will study this problem in the periodic setting. Even though the hierarchy is linear, it is non closed, in the sense that the equation for the  $k$ -th density matrix in the system depends on the  $(k + 1)$ -st density matrix. This structure poses its challenges in the study of the problem, in particular in the understanding of uniqueness of solutions. Moreover, by randomizing in the collision operator, it is possible to use probabilistic techniques in order to study related hierarchies at low regularities. I will present some recent results obtained on these problems, partly in joint work with Philip Gressman, Sebastian Herr, and Gigliola Staffilani.

Monday, September 28th, 2015  
4 : 10pm-5pm, 740 Evans Hall