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SEMINAR OF NUMERICAL ANALYSIS

> THURSDAY 1ST NOVEMBER 2018 - ROOM MA A1 10 - 16:15

Prof Patrick HENNING (KTH, Sweden) will present a seminar entitled:

« Finite element discretizations for nonlinear Schrödinger equations with rough potentials»

Abstract:

In this talk we consider the numerical solution of a class of non-linear Schrödinger equations by Galerkin finite elements in space and a mass- and energy conserving variant of the Crank-Nicolson method in time. The usage of finite elements becomes necessary if the equation contains terms that dramatically reduce the overall regularity of the exact solution. Examples of such terms are rough potentials or disorder potentials as appearing in many physical applications. We present some analytical results that show how the reduced regularity of the exact solution could affect the expected convergence rates and how it results in possible coupling conditions between the spatial mesh size and the time step size. We will also demonstrate the significant importance of numerical energy-conservation in applications with low-regularity by simulating the phase transition of a Mott insulator into a superfluid.

Lausanne, 25 October 2018/AA/vl