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Natasa Pavlovic is a Professor of Mathematics at the University of Texas at Austin. She joined the Department of Mathematics at the University of Texas at Austin as an Assistant Professor in 2007, following a faculty appointment at Princeton University and postdoctoral appointments at the Institute for Advanced Study and Princeton University. Pavlovic completed her PhD at the University of Illinois at Chicago in 2002 under the supervision of Susan Friedlander and Nets Katz. The focus of Pavlovic's research is on partial differential equations, including wave and dispersive equations which are used as models for many wave phenomena from Bose-Einstein condensation to formation of freak waves in an ocean, equations of fluid motions and kinetic equations that describe dynamics of a dilute gas and are at the core of applied analysis, probability and statistical physics. She was a recipient of a Sloan Fellowship in 2008, held an Eisenbud Professorship at the Mathematical Sciences Research Institute in Berkeley in Fall 2015, and was named a Fellow of the American Mathematical Society in 2016. Also Pavlovic was an elected member at large of the Council of the American Mathematical Society and served on the Council in the period 2013 - 2016. Her teaching at the University of Texas at Austin has been recognized by John R. Durbin Teaching Excellence in Mathematics Award in 2009 and by the College of Natural Sciences Teaching Excellence Award in 2010.

Title: Back and forth from quantum many particle systems to nonlinear PDE, and applications to kinetic equations

Abstract: Analysis of large systems of interacting particles is a key for predicting and understanding various phenomena arising in different contexts, from physics (in understanding e.g. boson stars) to social studies (when modeling social networks). Since the number of particles is usually very large one would like to understand qualitative and quantitative properties of such systems of particles through some macroscopic, averaged characteristics. In order to identify macroscopic behavior of multi-particle systems, it is helpful to study the asymptotic behavior when the number of particles approaches infinity, with the hope that the limit will approximate properties observed in the systems with a large finite number of particles. An example of an important phenomenon that describes such macroscopic behavior of a large system of particles is the Bose-Einstein condensation. Mathematical models have been developed to understand such phenomena. Those models connect large quantum systems of interacting particles and nonlinear PDE that are derived from such systems in the limit of the number of particles going to infinity. In this talk we will focus on developments that connect a quantum many particle system of bosons and the nonlinear Schrodinger equation, and will apply some of the ideas appearing in this context to a new program of studying well-posedness of Boltzmann equation, which describes the evolution of the probability density of independent identically distributed particles modeling a rarefied gas with predominantly binary elastic interactions.
This talk is based on joint works with Thomas Chen, and with Thomas Chen and Ryan Denlinger.