

COLLOQUIUM BY PETER PICKL

DERIVATION OF EFFECTIVE DESCRIPTION FOR INTERACTING MANY-BODY SYSTEMS

TIME: 16:30PM-17:30PM, THURSDAY, 24 AUG 2017

VENUE: ACADEMIC BUILDING 1079

Derivation of Effective Description for Interacting Many-Body Systems

Speaker: Prof Peter Pickl, Mathematisches Institut, Ludwig-Maximilians-Universität München



ABSTRAT:

In the late 19th century scientists around Ludwig Boltzmann and James Clark Maxwell had the ingenious idea that the physics of gases can be described by the motion of a large number of atoms. Starting from the Newtonian motion of many point particles (atoms), these scientists were able to deduce many laws describing the behavior of gases and other macroscopic objects and brought the understanding of their physics to a new level. Their works have even triggered the birth of a new branch of science: statistical mechanics.

Today, with mathematical methods being used in various fields of sciences, such microscopic derivations of effective descriptions of interacting many-body systems is more actual than ever. How can one explain the behavior of a school of fish starting from the motion of the individual animal and his reaction to his fellows? How the transmission of a radio signal by the patter of photons (light particles) on the antenna? How the live cycle of the slime mold before the spore is formed by the motion of the single amoebas it is made of?

In recent years Peter has developed mathematical methods which answer all these and many other questions. His new technique developed for quantum systems made it possible to generalize many of the results in the literature and approach new systems, where other methods fail. His entirely different approach designed for classical systems gives by far the strongest results concerning singular interactions. Note that most interesting interactions in nature have singularities - e.g. the electrostatic interaction between charged objects as well as gravity. Both methods are now used by many other scientists.

In the talk, he will explain the connection between microscopic and macroscopic description on the basis of a descriptive example and give an overview of his research.

BIO:

Since September 2010 Peter is a professor at LMU Munich which is, with 34 Nobel prize laureates educated in the past, one of the most important research institutions in Europe. He got his PHD in Mathematics in 2005 at LMU for his dissertation on particle-antiparticle pair-creation in strong electric fields. After that he was postdoc at the University of Tübingen, the University of Vienna and ETH Zürich.

This event is open to all and entry is on a first come, first served basis. For any queries email yg73@duke.edu or call 3665 7149.