

Department of Mathematical Sciences welcomes



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Dispersive shocks and blow up

ABSTRACT:

Nonlinear dispersive partial differential equations appear in applications in hydrodynamics, nonlinear optics, plasma physics, Bose-Einstein condensates, . . . whenever dispersion dominates dissipation. Despite their omnipresence in applications, their mathematical understanding is far less complete than for dissipative equations. This is due to challenging features of the solutions to these equations:

1. Solitons are particle-like solutions where effects of the nonlinearity and the dispersion balance. It is conjectured that stable solitons appear in the long-time behavior of generic solutions to the equation.
2. Zones of rapid modulated oscillations called dispersive shock waves appear near shocks of the corresponding dispersionless equations.
3. In cases where the nonlinearity dominates dispersion, a blow-up, i.e., a loss of regularity of the solution, is possible in finite time.

Asymptotic and numerical descriptions of dispersive shocks and blow-ups are demanding and could so far only be given for certain cases. The talk aims at a review of these features and of recent attempts to address them.

ABOUT THE SPEAKER:

Christian Klein got his PhD at 1993 from University of Tübingen under the supervision of Professor Herbert Pfister. He was two-times a Murie-Curie Research Fellow – first time in LGCR, University Paris VI (2000-2001) and the second time in LUTH, Observatoire de Paris, Meudon (2002-2003). He has also been two times Schloessmann Research Fellow in Werner-Heisenberg Institute, Munich (2001-2001; 2003-2004) and a Research Fellow in Max-Planck Institute, Leipzig (2004-2007). Since 2007, Christian Klein is a Professor in Institut de Mathématiques de Bourgogne, University of Burgundy, Dijon. Professor Klein is a well known expert in integrable systems. His research is focused on the asymptotic, algebra-geometric and numeric aspects of the theory and applications of integrable systems. Professor Klein has made several major contributions to these fields.

**NOTE TIME CHANGE
DUE TO 2 SPEAKERS
THIS WEEK.**

November 22, 2019

Hosted by:
Prof. Alexander Its

Tea begins at 2:30
in LD 259

Research Topic
begins at 4:15
in LD 229

