

Workshop on "Quantized Vortices in Superfluidity and Superconductivity and Related Problems"

Location: Seminar Room C206/207

Mon, 01. Jul (Opening: 10:00) - Fri, 5. Jul 13

Organisers

Weizhu Bao (NUS/Beijing CSRC)

Claude Bardos (Univ Paris)

Qiang Du (Penn State University)

Norbert J. Mauser (WPI c/o U. Wien)

Monday, July 1, 2013

Morning Session

09:00 – 10:00 Registration

10:00 – 10:10 Welcome by **N. J. Mauser** and **W. Bao**

10:10 – 10:50 **Israel M. Sigal**: Magnetic Vortices, Nielsen-Olesen - Nambu strings and theta functions

10:50 – 11:20 Coffee break

11:20 – 12:00 **Peter Sternberg**: Kinematic Vortices in a Thin Film Driven by an Electric Current

12:00 – 02:00 Lunch (on your own)

Afternoon Session

02:00 – 02:40 **Patricia Bauman**: Analysis of Energy Minimizers for Nematic Liquid Crystals with Disclination-Line Defects

02:40 – 03:10 Coffee break

03:10 – 03:50 **Jean-Claude Saut**: New results on the dispersive blow-up for NLS type equations

03:50 – 04:30 **Christof Sparber**: On nonlinear Schrödinger type equations with nonlinear damping

Tuesday, July 2, 2013

Morning Session

09:00 – 09:30 Registration

09:30 – 10:10 **Leonid Berlyand:** Phase Separation of Multiple Ginzburg-Landau Vortices Pinned by Small Holes

10:10 – 10:40 Coffee break

10:40 – 11:20 **Daniel Phillips:** Analysis of defects in minimizers for a planar Frank energy

11:20 – 12:00 **Yann Brenier:** Diffusion of knots and magnetic relaxation

12:00 – 02:00 Lunch (on your own)

Afternoon Session

02:00 – 02:40 **Francis Nier:** Artificial gauge adiabatic Ansatz for Bose-Einstein Condensates

02:40 – 03:10 Coffee break

03:10 – 03:50 **Qiang Du:** Phase diagrams for quantized vortex states in superconductors

03:50 – 04:30 **Nicolas Besse:** On the Cauchy problem of the waterbag continuum

Wednesday, July 3, 2013

Morning Session

09:30 – 10:10 **Ionut Danaila:** Minimization methods for computing stationary vortex states of fast rotating Bose-Einstein condensates

10:10 – 10:50 **Qinglin Tang:** Numerical studies on the quantized vortex dynamics and interaction in superfluidity and superconductivity

Trip to Wachau (Valley of Danube): Bus to Melk (paid by WPI), Abbey Melk (optionally), Boat trip, Walk/Hike, Heurigen, Train back to Vienna

Thursday, July 4, 2013

Morning Session

- 09:30 – 10:10 **Jie Shen:** Fast Spectral-Galerkin Methods for High-Dimensional PDEs and Applications to the electronic Schrödinger equation
- 10:10 – 10:40 Coffee break
- 10:40 – 11:20 **Shidong Jiang:** Fast and accurate evaluation of dipolar interactions in Bose-Einstein condensates
- 11:20 – 12:00 **Mechthild Thalhammer:** Convergence analysis of high-order time-splitting generalized-Laguerre-Fourier-Hermite pseudo-spectral methods for rotational Gross-Pitaevskii equations
- 12:00 – 02:00 Lunch (on your own)

Afternoon Session

- 02:00 – 02:40 **Dieter Jaksch:** Laser control of Josephson phases in heterostructures
- 02:40 – 03:10 Coffee break
- 03:10 – 03:50 **Igor Mazets:** Many-body physics with ultracold-atomic 1D quasicondensates
- 03:50 – 04:30 **Hanns-Christoph Nägerl:** Quench dynamics in strongly correlated Bose-Hubbard chains
- 06:30 – 09:00 **Banquet** (Volunteer and food self-paid, drinks on the WPI)

Friday, July 5, 2013

Morning Session

- 09:30 – 10:10 **Yang Xiang:** Modeling and simulation of dislocations at different scales
- 10:10 – 10:40 Coffee break
- 10:40 – 11:20 **Weiqing Ren:** Modeling rare events in complex systems
- 11:20 – 12:00 **Shouhong Wang:** Unified Field Theory of Four Interactions
- 12:00 – 12:10 Closing Remarks
- 12:10 – 02:00 Lunch (on your own)

Afternoon Session outside workshop program: grad students talks

02:00 – 02:40 **Thomas Moser:** The young person's guide to numerics for NLS

02:40 – 03:10 **Florian Kogelbauer:** Quantum Hydrodynamics and Quantum Trajectories