Microlocal Day #1

Imperial College London, UK

24-25 June, 2010

Organisers

Claudia Garetto
Jens Wirth
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(Imperial College London)

This workshop is dedicated to Ari Laptev 60th birthday

Conference Venue: Room 130, Huxley Building, Imperial College London

Address : Department of Mathematics, Imperial College London, 180 Queen's Gate, London SW7 2AZ, United Kingdom

The Microlocal Day is a new initiative of a short and intensive series of lectures devoted to different aspects of the microlocal analysis and related topics. The program includes research lectures as well as survey lectures aimed at researchers and PhD students interested in the subject. All are welcome to attend.

Speakers

- **Christiane Böhme** (University of Freiberg, *Germany*)
- **Donal Connolly** (Imperial College London, *UK*)
- **Niels Jacob** (Swansea University, *UK*)
- **Ari Laptev** (Imperial College London, *UK*)
- **Michael Oberguggenberger** (University of Innsbruck, *Austria*)
- **Cesare Parenti** (University of Bologna, *Italy*)
- **Jens Wirth** (Imperial College London, *UK*)

Schedule

Thursday, 24 June, 1-5.30pm, Imperial College, Room 130

- **1pm** Ari Laptev (Imperial College London) On some spectral inequalities for non-elliptic partial differential operators
- **2pm** Niels Jacob (Swansea) Markov Semi-groups generated by Pseudo-differential Operators. An Introduction
- **3pm** Cesare Parenti (Bologna) The Cauchy Problem for Linear Hyperbolic Operators with double Characteristics
- **4:30pm** Michael Oberguggenberger (Innsbruck) Regularity theory for solutions to PDEs in algebras of generalized functions

The last two talks are held jointly with the London Analysis Seminar

Friday, 25 June, 11am-1pm, Imperial College, Room 130

- **11:00-11:40** Christiane Böhme (Freiberg) *Energy estimates for Klein-Gordon type models with time-dependent potential*
- **12:20-13:00** Jens Wirth (Imperial College London) *On singular hyperbolic Cauchy problems*

For further information please contact

Michael Ruzhansky at this e-mail address

Suggestion of hotels in the area

Merlyn Court Hotel
Maranton House Hotel

How to get to the Department of Mathematics, Imperial College London

Travel to the tube station **Gloucester Road** (District, Circle, and Piccadilly Lines).
When you exit the station, turn left along Gloucester Road, crossing Cromwell Road 50 meters from the exit.

After 4-5 minutes walk along Gloucester Road, turn right to Queen's Gate Terrace.
This is a short road leading directly to the entrance of the Huxley Building, at 180 Queen's Gate. We are on floor 6.

Some abstracts

Christiane Böhme (Freiberg) *Energy estimates for Klein-Gordon type models with time-dependent potential*

In this talk we investigate Klein-Gordon type models whose mass term is essentially described by a decreasing function and an oscillating perturbation. In dependence on the interplay between the decay and the oscillations of the coefficient we are interested in statements about generalized energy conservation. Therefore, we take advantage of a refined diagonalization procedure.

Ari Laptev (Imperial College London) *On some spectral inequalities for non-elliptic partial differential operators*

I shall give a proof of some spectral inequalities for the moments of the eigenvalues for a class non-elliptic Partial Differential Operators for which phase volume type estimates do not exist.

Cesare Parenti (Bologna) *The Cauchy Problem(CP)$\diamondsuit$ for Linear Hyperbolic Operators with double Characteristics*

I will give a survey lecture on some recent results concerning two main problems which did not receive much attention in the last years:

1) Well posedness of the CP in case of transition in the spectrum of the Hamiltonian map at different points of the double manifold
2) To what extent the usual Ivrii-Petkov-Hormander necessary conditions on the lower order terms of the operator are also sufficient for the well posedness of the CP?

Michael Oberguggenberger (Innsbruck) *Regularity theory for solutions to PDEs in algebras of generalized functions*

This talk addresses regularity and propagation of singularities of solutions to partial differential and pseudo-differential equations with non-smooth coefficients. The equations will be studied in the framework of Colombeau algebras of generalized functions. Various notions of regularity in this setting will be introduced, motivated and related to classical notions from distribution theory. The issues range from linear to nonlinear equations and from elliptic regularity to the propagation of wave front sets.

Jens Wirth (Imperial College London) *On singular hyperbolic Cauchy problems*

Within this talk we consider the question of well-posedness of the Cauchy problem
$$
$\diamondsuit$ u_{tt} - a^2(t) u_{xx} = 0,$\diamondsuit$ u(0,\cdot)=u_0, u_t(0,\cdot)=u_1
$$
under weak regularity assumptions on the coefficient function $a(t)$.
It is well-known that problems of this type are Sobolev well-posed if $a(t)$ is Lipschitz, but fail to be C^∞ well-posed if coefficients are just H\"older continuous. For weaker regularity of coefficients the appropriate framework are Gevrey classes. We will review some results in that direction and discuss some new diagonalisation-based approaches using additional stabilisation-type assumptions on coefficients.

Program and all abstracts as a pdf file