Symplectic Geometry and Global Analysis Conference

The primary aim of the conference is to gather together experts in symplectic geometry and related areas of global analysis to discuss recent advances and find possible new directions of research in these areas. It also provide a good opportunity for young scholars and graduate students to enter this area.

Participants

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Sponsers

- School of Mathmatical Sciences, USTC
- Wu Wen-Tsun Key Laboratory of Mathematics, USTC, CAS
- Tian-Yuan Foundation

Organizers

- Xiaonan Ma （法国巴黎七大）
- Zuoqin Wang （中国科学技术大学）

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For more information, please visit: http://staff.ustc.edu.cn/~wangzuoq/Conferences/SGAGA2015/

Time

From August 10 to August 11

Location

中国科学技术大学 管理楼 1518（靠近科大东区北门）

Accommodation

悦雅江南春酒店
合肥市金寨路 64 号（金寨路与太湖路交叉口）

Map

Program

Date	Time	Speaker	Title
August 9	All Day	Registration	
August 10	9:00-10:00	王宏玉 （扬州大学）	From Kodaira Conjecture to Donaldson question
	10:00-10:30	Coffee break	
	10:30-11:30	李逸 （上海交通大学）	A geometric flow and Hopf's conjecture
	11:30-14:00	Lunch break	
	14:00-15:00	李慧 （苏州大学）	The fundamental group of G-manifolds
	15:00-16:00	刘博 (Humboldt University)	Geometric model for differential K-theory
	16:00-16:30	Coffee break	
	16:30-17:30	卢文 （华中科技大学）	Optimal convergence speed of Bergman metrics on symplectic manifolds
	18:00-20:00	Banquet	
August 11	9:00-10:00	麻小南 （法国巴黎七大）	Toeplitz operator and vanishing theorem
	10:00-10:30	Coffee break	
	10:30-11:30	朱家林 （复旦大学上海数学中心）	Gluing formula of analytic torsion and Scattering matrix
	11:30-14:00	Lunch break	
	14:00-15:00	冯仁杰 （北京国际数学中心）	Extrema of random holomorphic fields
	15:00-16:00	俞建青 （中国科学技术大学）	Higher Spectral Flow for Dirac Operators with Local Boundary Conditions
	16:00-16:30	Coffee break	
	16:30-17:30	杨晓奎 （中国科学院数学与系统科学研究院）	The Kahler-Ricci flow and collapsing limits

Titles and Abstracts

Speaker: 王宏玉 (扬州大学)

Title: From Kodaira Conjecture to Donaldson question

Abstract: In this talk, we show that any tamed closed almost complex four-manifold with self-dual second Betti number one, there exists a new sympletcic form compatible with the given almost complex structure, Then, we give an affirmative answer to Donaldson question for tamed closed almost complex four-manifolds with self-dual second Betti number one. Our approach is along the lines used by Buchdahl to give a unified proof of the Kodaira Conjecture.

Speaker: 李逸 (上海交通大学)

Title: A geometric flow and Hopf's conjecture

Abstract: In this talk, I will discuss a geometric flow recently introduced by Kefeng Liu and I on vector fields. This flow has its nature both in geometry and PDEs, in particular, in connecting with the long-standing two conjectures of Hopf and a problem of Yau.

Speaker: 李慧 (苏州大学)

Title: The fundamental group of G-manifolds

Abstract: Assume a compact connected Lie group acting on a symplectic manifold. We will discuss the fundamental group of the symplectic manifold, and that of the orbit space; when the Lie group action is Hamiltonian, we also discuss the fundamental groups of all the symplectic quotients.

刘博 (Humboldt University)

Title: Geometric model for differential K-theory

Abstract: In this talk, by using family index theorem, eta form and higher spectral flow, we will construct a new geometric model for differential K-theory on closed manifolds and define the push-forward map. Furthermore, we will extend this model and the corresponding properties to the orbifold case.

Speaker: 卢文 (华中科技大学)

Title: Optimal convergence speed of Bergman metrics on symplectic manifolds

Abstract: It is known that a compact symplectic manifold endowed with a prequantum line bundle can be embedded in the projective space generated by the eigensections of low energy of the Bochner Laplacian acting on high p-tensor powers of the prequantum line bundle. We show that the Fubini-Study metrics induced by these embeddings converges at speed rate $1/p^2$ to the symplectic form. This is a joint work with Professors Xiaonan Ma and George Marinescu.

Speaker: 麻小南 (法国巴黎七大)

Title: Toeplitz operator and vanishing theorem

Abstract: We will explain a criteria on the vanishing of the de Rham cohomology group associated with a family of flat vector bundles, this is a real analogy of the vanishing theorem of Kodaira-Serre. The theory on the Toeplitz operators plays an important role.

Speaker: 朱家林 (复旦大学上海数学中心)

Title: Gluing formula of analytic torsion and Scattering matrix

Abstract: In this talk I will introduce our joint work with Martin Puchol, Yeping Zhang on the gluing formula of analytic torsion. We give an analytic proof of the gluing formula of Brüning-Ma of analytic torsion by using the adiabatic method and scattering matrix.

Speaker: 冯仁杰 (北京国际数学中心)

Title: Extrema of random holomorphic fields

Abstract: In the first part of the talk, I will define the random holomorphic fields and exhibit several well-known results. In the second part, two of my results on the extrema of random fields will be given: the distribution of critical values and the mean value of the supremum of L^2-normalized fields. I will also discuss several open problems.

Speaker: 俞建青 (中国科学技术大学)

Title: Higher Spectral Flow for Dirac Operators with Local Boundary Conditions

Abstract: We consider a gauge invariant one parameter family of families of fiberwise twisted Dirac type operators on a fiberation with the typical fiber an even dimensional compact manifold with boundary, i.e., a family $\{D_u\}, u \in [0,1]$ with $D_1 = gD_0g^{-1}$ for a suitable unitary automorphism g of the twisted bundle. Suppose all the operators D_u are imposed with a certain *local elliptic* boundary condition F and $D_{u,F}$ is the self-adjoint extension of D_u. We establish a formula for the higher spectral flow of $\{D_{u,F}\}$, $u \in [0,1]$. Our result generalizes a recent result of Gorokhovsky and Lesch to the families case. If time permits, I will also touch briefly on the equivariant higher spectral flow, which is the potential joint work with Fei Han.

Speaker: 杨晓奎 (中国科学院数学与系统科学研究院)

Title: The Kahler-Ricci flow and collapsing limits

Abstract: We discuss the Kahler-Ricci flow on holomorphic fiber spaces whose generic fiber is a Calabi-Yau manifold. We establish uniform metric convergence to a metric on the base, away from the singular fibers, and show that the rescaled metrics on the fibers converge to Ricci-flat Kahler metrics. This strengthens previous work of Song-Tian and others. This is joint work with Ben Weinkove and Valentino Tosatti.