

2018 数学的一些最新研究进展学术研讨会

(2018 Workshop on Some Recent Progress in Mathematics)

武汉大学数学与统计学院

(School of Mathematics and Statistics, Wuhan University)

武汉，2018年7月24日-26日(Wuhan, July 24--26, 2018)

组织委员会(Organizing Committee):

Wenyi Chen (Wuhan University)

Yuxin Ge (Université de Toulouse III (Paul Sabatier), France)

Xiaonan Ma (Université Paris Diderot, France)

Huijiang Zhao (Wuhan University)

邀请报告人 (Invited Speakers):

Yuxin Ge (Université de Toulouse III (Paul Sabatier), France)

Jingyin Huang (Max Planck Institute for Mathematics, Bonn, Germany)

Bo Liu (East China Normal University)

Xiaonan Ma (Université de Paris VII (Denis Diderot), France)

Yi Wang (Johns Hopkins University, USA)

Zhiren Wang (Pennsylvania State University, USA)

Program of the Workshop

Venue: Room 404, Dongbei Lou, School of Mathematics and Statistics, Wuhan University

(武汉大学理学院东北楼四楼学术报告厅)

July 25-Wednesday, 2018		
	Speaker	Chair
09:30-10:20	Xiaonan Ma (Université Paris Diderot, France)	Huijiang Zhao
10:25-11:15	Zhiren Wang (Pennsylvania State University, USA)	Huijiang Zhao
11:20-12:10	Jingyin Huang (Max Planck Institute for Mathematics, Bonn, Germany)	Huijiang Zhao
12:15-14:30	Lunch, Tianyuan Xiaoguanyuan (田园小观园)	
14:30-15:20	Yuxin Ge (Université de Toulouse III (Paul Sabatier), France)	Wenyi Chen
15:25-16:15	Yi Wang (Johns Hopkins University, USA)	Wenyi Chen
16:20-17:10	Bo Liu (East China Normal University)	Wenyi Chen
17:30	Dinner, Tianyuan Xiaoguanyuan (田园小观园)	
July 26-Thursday, 2018		
09:30-12:15	Free discussion	Xiaonan Ma
12:15-14:30	Lunch, Tianyuan Xiaoguanyuan (田园小观园)	
14:30-17:30	Free discussions	Yuxin Ge
17:30	Dinner, Tianyuan Xiaoguanyuan (田园小观园)	

Abstracts

Compactness of conformally compact Einstein manifolds in dimension 4

Yuxin Ge (葛宇新)

Université de Toulouse III (Paul Sabatier), France

We show some compactness result of 4-dimensional conformally compact Einstein manifolds under the suitable assumptions on the topology of the manifolds, on the compactness of their conformal infinity and on some suitable conformal invariants. We discuss also the existence and uniqueness of such manifolds when the conformal infinity is close to the standard 3-sphere.

Uniform lattices acting on RAAG complexes

Jingyin Huang (黄靖尹)

Max Planck Institute for Mathematics, Vivatsgasse 7, 53111 Bonn, Germany

A classical result by Bieberbach says that uniform lattices acting on Euclidean spaces by isometries are virtually free abelian. On the other hand, uniform lattices acting on trees are virtually free. This motivates the study of commensurability classification of uniform lattices acting on CAT(0) cube complexes associated with right-angled Artin groups (RAAG complexes). These complexes can be thought as “interpolations” between Euclidean spaces and trees. Uniform lattices acting on the same RAAG complex may not belong to the same commensurability class, as there are irreducible lattices acting on products of trees. However, we show that the tree times tree obstruction is the only obstruction for commensurability of label-preserving lattices acting on RAAG complexes. Some connection of this problem with Haglund and Wise’s work on special cube complexes will be explained. If time permits, I will also discuss some applications to quasi-isometric rigidity of RAAGs.

Localization formula for eta invariants

Bo Liu (刘博)

East China Normal University

We establish a version of localization formula for equivariant eta-invariants by combining an extension of Goette's result on the comparison of two types of equivariant eta-invariants and a localization formula in differential K-theory for circle-action. This is a joint work with Professor Xiaonan Ma.

From signature of symmetric matrices to eta invariant

Xiaonan Ma (麻小南)

Université Paris Diderot, France

The eta invariant of an elliptic operator is the infinite dimensional analogue of the signature of a symmetric matrix. We will give an introduction on the eta invariant, in particular how it is naturally appeared in the index theorem for manifolds with boundary.

When there is a compact Lie groupe action, we will explain that its equivariant version, the equivariant eta invariant, as a function on the group, is not a continue function. We will describe its singularities.

This is a joint work with Bo Liu.

Nonuniqueness for a fully nonlinear boundary Yamabe-type problem

Yi Wang (王一)

Johns Hopkins University, USA

We consider σ_k -curvature equation with H_k -curvature condition on a compact manifold with boundary (X^{n+1}, M^n, g) . When restricting to the closure of the positive k -cone, this is a fully nonlinear elliptic equation with a fully nonlinear Robin-type boundary condition. We prove a general

bifurcation theorem in order to study nonuniqueness of solutions when $2k < n+1$. We explicitly give examples of product manifolds with multiple solutions. It is analogous to Schoen's example for Yamabe problem on $S^1 \times S^{n-1}$. This is joint work with Jeffrey Case and Ana Claudia Moreira.

Rigidity of hyperbolic actions by lattices on nilmanifolds

Zhiren Wang (王之任)

Pennsylvania State University, USA

In this talk, we will discuss why actions by lattices of higher rank semisimple Lie groups on nilmanifolds should be modeled upon linear actions under certain hyperbolic assumptions. This is based on joint works with A. Brown and F. Rodriguez Hertz.