微分几何论坛

2024 年 1 月 17 日-21 日

主办单位： 复旦大学　首都师范大学

协办单位： 同济大学

会议简介

为了加强微分几何与几何分析领域的合作，促进同行专家学者之间的交流，了解最新的前沿学术动态，复旦大学与首都师范大学联合在上海数学中心举办首届“微分几何论坛”。

主办单位： 复旦大学　首都师范大学

协办单位： 同济大学

会议议程： 2024 年 1 月 17 日报到

2024 年 1 月 18 日至 21 日学术报告

会议地点： 上海数学中心谷超豪报告厅

学术委员会

方复全　　李　骏　　田　刚

组织委员会

丁　琪　　傅吉祥　　沈伟明　　王志超

杨　翎　　张永胜　　张振雷

服务指南

1. 住宿宾馆：上海五角场博邻酒店与行政公寓

   （上海市杨浦区殷行路 1258 号）；

   会议地点：复旦大学江湾校区上海数学中心谷超豪报告厅

   （上海市杨浦区淞沪路 2005 号上海数学中心二楼）

2. 为保证会场秩序，会议期间请将通讯工具设置为振动或静音模式

3. 届时有驳车安排，敬请关注实时通知

4. 会议联系人：

   丁琪　15821715208，dingqi@fudan.edu.cn

   沈伟明　18810515841，wmshen@aliyun.com

   王志超　13774225079，zhichao@fudan.edu.cn

   杨翎　13564490598，yanglingfd@fudan.edu.cn

   张永胜　19910399659，yongsheng.chang@gmail.com

   张振雷　15011367692，zhleigo@aliyun.com

   赵晓婷　18829202117，zhaoxiaoting@fudan.edu.cn

地铁交通信息

1. **上海虹桥机场**乘坐地铁 10 号线（基隆路方向）至“新江湾城站”下车，地铁全程约 26 站大约耗时 1 小时，出地铁 1 号口后步行（8 分钟左右）到达上海五角场博邻酒店与行政公寓

2. **上海虹桥火车站**乘坐地铁 10 号线（基隆路方向）至“新江湾城站”下车，地铁全程约 27 站大约耗时 1 小时，出地铁 1 号口后步行（8 分钟左右）到达上海五角场博邻酒店与行政公寓

3. **上海浦东机场**首先乘坐地铁 2 号线（徐泾东方向）至“南京东路”（大约耗时 1 小时），地铁内换乘地铁 10 号线（基隆路方向）至“新江湾城站”下车（大约耗时 26 分钟），出地铁 1 号口后步行（8 分钟左右）到达上海五角场博邻酒店与行政公寓

4. **上海火车站**首先乘坐地铁 4 号线（宝山路方向）至“海伦路”（大约 8 分钟），地铁内换乘地铁 10 号线（基隆路方向）至“新江湾城站”下车（耗时约 20 分钟），出地铁 1 号口后步行（8 分钟左右）到达上海五角场博邻酒店与行政公寓

5. **上海南站**首先坐地铁 1 号线（富锦路方向）至“陕西南路站”（大约 15 分钟），地铁内换乘到地铁 10 号线（基隆路方向）至“新江湾城站”下车（耗时约 35 分钟），出地铁 1 号口后步行（8 分钟左右）到达上海五角场博邻酒店与行政公寓

参考地图


N
2号门
上海数学中心
1号门
5号门
3号门
復旦大學 校园地图
江湾校区


复旦大学江湾校区3号门
终
嘉誉湾
嘉誉湾-3期
加州水郡
上海数学中心
访问学者宿舍
18号
11号
10号线
217号楼
8号楼
麦麦山云南菜
盒马鲜生
博邻酒店
上海市杨浦区政和路501号
星巴克
枫悍大厦
新江湾城
殷行路

会议日程

1 月 17 日（星期三）

报到地点：上海五角场博邻酒店与行政公寓

时间	日程
	报到
18:00-20:30	自助餐（宾馆）

1 月 18 日（星期四）

会议地点：上海数学中心谷超豪报告厅

时间	报告人	报告题目	主持人
8:50-9:00	开幕式		
9:00-10:00	田刚	H-invariant revisited	李骏
10:00-10:30	茶歇，合影		
10:30-11:15	简旺键	Constant scalar curvature Kahler metrics on minimal models	李嘉禹
11:25-12:10	戎小春	Quantitative maximal rigidities of Ricci curvature bounded below	张会春
12:10-13:10	午餐（江湾食堂 3 楼）		
14:30-15:15	李嘉禹	On the symplectic mean curvature flows	王宏玉
15:25-16:10	马翔	Mean curvature rigidity phenomenon and its extensions	彦文娇
16:10-16:40	茶歇		
16:40-17:25	盛为民	Dirichlet problem for Krylov type equation in Riemannian geometry	张希
18:10-20:00	晚宴		

1 月 19 日（星期五）

会议地点：上海数学中心谷超豪报告厅

时间	报告人	报告题目	主持人
9:00-9:45	李海中	Hyperbolic p-sum and horospherical p-Brunn-Minkowski theory in hyperbolic space	陈群
9:45-10:15	茶歇		
10:15-11:00	邱红兵	Curvature estimates of ancient solutions to the mean curvature flow of higher codimension with convex Gauss image	徐兴旺
11:10-11:55	陈世炳	How free boundary meet fixed boundary in Optimal transportation	李奇睿
11:55-12:55	午餐（江湾食堂 3 楼）		
14:30-15:15	刘钢	Complete Kahler manifolds with nonnegative Ricci curvature	杨义虎
15:25-16:00	盛利	Extremal Metrics on Toric Manifolds	夏超
16:10-16:40	茶歇		
16:40-17:25	葛化彬	Rigidity of hyperbolic polyhedral 3-manifolds	潘生亮
17:50-19:30	晚餐（江湾食堂 3 楼）		

1 月 20 日（星期六）

会议地点：上海数学中心谷超豪报告厅

时间	报告人	报告题目	主持人
9:00-9:45	忻元龙	Bernstein theorem in minimal surface theory	刘小博
9:45-10:15	茶歇		
10:15-11:00	袁伟	Curved Versions of the Ovsienko-Redou Operators	莫小欢
11:10-11:55	刘博	Recent progress on Bismut-Cheeger eta forms	陈学长
11:55-12:55	自助餐（宾馆）		
13:50-14:35	葛建全	Austere matrices, austere submanifolds and Dupin hypersurfaces	李海中
14:45-15:30	邓宇星	Rigidity of positively curved steady Ricci solitons on manifolds and orbifolds	郭洪欣
15:30-15:50	茶歇		
15：50-16：35	王相生	Some progress on Llarull's theorem and its generalizations	郑宇
16:45-17:30	王志张	The prescribed curvature problem in Minkowski space	周斌
17:50-19:30	晚餐（江湾食堂 3 楼）		

1 月 21 日（星期日）

会议地点：上海数学中心谷超豪报告厅

时间	报告人	报告题目	主持人
9:00-9:45	周鑫	Recent Developments in Constant Mean Curvature Hypersurfaces	张振雷
9:45-10:15	茶歇		
10:15-11:00	王童瑞	Free boundary minimal hypersurfaces in locally wedge-shaped manifolds	韦勇
11:10-11:55	沈伟明	Blow up sets of Ricci curvatures of complete conformal metrics	傅吉祥
11:55-12:55	午餐（盒饭）		
	会议结束		

报告摘要

How free boundary meet fixed boundary in Optimal transportation

陈世炳
中国科学技术大学

We will discuss the global regularity of free boundary in optimal partial transport. In particular, we will show that the free boundary always intersects the fixed boundary in a nice way.

Rigidity of positively curved steady Ricci solitons on manifolds and orbifolds

邓宇星
北京理工大学

Steady Ricci solitons are important examples of singularities models. In higher dimensions, singularity models can be steady Ricci solitons on orbifolds. In this talk, we will review some rigidity theorems on positively curved steady Ricci solitons on manifolds. We will also classify positively curved noncollapsed steady Ricci solitons on orbifolds that dimension reduce to quotients of spheres.

Rigidity of hyperbolic polyhedral 3-manifolds

葛化彬
中国人民大学

We show the rigidity of hyperbolic cone 3-manifolds which are isometric gluing of hyperbolic tetrahedrons, i.e., the hyperbolic polyhedral metric is determined by its curvature. This is joint work with Ke Feng and Chunlei Liu.

Austere matrices, austere submanifolds and Dupin hypersurfaces

葛建全
北京师范大学

We introduce a recent work joint with Yi Zhou about austere matrices and austere submanifolds, which is motivated from isoparametric theory and related to Bryant's austere space and Dupin hypersurfaces. In particular, we solve a problem proposed by Thorbergsson in his 2000 survey paper.

Constant scalar curvature Kahler metrics on minimal models

简旺键
中科院数学所

We will review the existence of constant scalar curvature Kahler metrics on minimal models. Then we will talk about the new estimates obtained for such canonical metrics. Finally we will talk about some further problems. This is based on the joint work with Guo, Shi and Song.

Hyperbolic p-sum and horospherical p-Brunn-Minkowski theory in hyperbolic space

李海中
清华大学

The classical Brunn-Minkowski theory studies the geometry of convex bodies in Euclidean space by use of the Minkowski sum. It originated from H. Brunn's thesis in 1887 and H. Minkowski's paper in 1903. Since there is no universally acknowledged definition of the sum of two sets in hyperbolic space, there has been no Brunn-Minkowski theory in hyperbolic space since 1903. In this talk, for any p>0 we introduce a sum of two sets in hyperbolic space, and we call it the hyperbolic p-sum. Then we develop a Brunn-Minkowski theory in hyperbolic space by use of our hyperbolic p-sum, and we call it the horospherical p-Brunn-Minkowski theory. This is joint work with Botong Xu.

On the symplectic mean curvature flows

李嘉禹
中国科学技术大学

We will talk about the recent progress on symplectic mean curvature flows. We will prove a Bernstein Type theorem for symplectic Translating Soliton. This is a joint work with Professor Han Xiaoli and Sun Jun.

Recent progress on Bismut-Cheeger eta forms

刘博
华东师范大学

The Bismut-Cheeger eta form is the family extension of the Atiyah-Patodi-Singer eta invariant. In this talk, we will discuss our recent progress on generalizing the properties of the eta invariants to the Bismut-Cheeger eta forms.

Complete Kahler manifolds with nonnegative Ricci curvature

刘钢
华东师范大学

We discuss several results on complete Kahler manifolds with nonnegative Ricci curvature.

1. A question of Ni on the average of scalar curvature on manifolds with nonnegative bisectional curvature
2. The finiteness of Ric^n on manifolds with nonnegative Ricci curvature
3. A rigidity result on Kahler Ricci flat manifolds

Mean curvature rigidity phenomenon and its extensions

马翔
北京大学

A theorem by Gromov asserts that for a hyperplane in the Euclidean space E^n, any smooth perturbation with compact support and nonnegative mean curvature H must be trivial (i.e. identical to the original one). We will start by presenting Souam's simple proof of this rigidity result using the tangency principle. Then we consider similar problems for the unit (hyper-)sphere with mean curvature H=1 in E^n. Our main result says that when one perturbs the sphere only in a hemisphere, and the mean curvature H is no less than 1 for this smooth hypersurface after perturbation, then under quite natural conditions it must be congruent to the round sphere. On the other hand, if the fixed part of the sphere is only a small spherical cap, then there exist nontrivial perturbations on the complementary great spherical cap such that H is greater than 1 on the perturbed part. If time allowed, I will report further results and open problems in this direction. This is a joint work with Prof. Shibing CHEN (from USTC) and my previous student Shengyang WANG.

Curvature estimates of ancient solutions to the mean curvature flow of higher codimension

邱红兵
武汉大学

In this talk, we shall discuss ancient solutions to the mean curvature flows. By carrying out refined curvature estimates, we prove better rigidity theorems of complete noncompact ancient solutions to the mean curvature flow in higher codimension under various Gauss image restriction. This is a joint work with professor Y. L. Xin.

Quantitative maximal rigidities of Ricci curvature bounded below

戎小春
首都师范大学

In Riemannian geometry, a maximal rigidity on an n-manifold M of Ricci curvature bounded below by (n-1)H is a statement that a geometric or topological quantity of M is bounded above by that of an n-manifold of constant sectional curvature H, and "=" implies that M itself has constant sectional curvature H. A quantitative maximal rigidity says that if a geometric quantity of M is almost equal to the maximal, then M admits a nearby metric of constant sectional curvature H. In this talk, we will survey some recent advances in Metric Riemannian geometry in establishing quantitative maximal rigidities.

Blow up sets of Ricci curvatures of complete conformal metrics

沈伟明
首都师范大学

A version of the singular Yamabe problem in bounded domains yields complete conformal metrics with negative constant scalar curvatures. In this talk, we will talk about blow-up phenomena of Ricci curvatures of these metrics on domains whose boundary is close to certain limit set of a lower dimension. We will characterize the blow-up set according to the Yamabe invariant of the underlying manifold. In particular, we will prove that all points in the lower dimension part of the limit set belong to the blow-up set on manifolds not conformally equivalent to the standard sphere and that all but one point in the lower dimension part of the limit set belong to the blow-up set on manifolds conformally equivalent to the standard sphere. We will demonstrate by examples that these results are optimal.

Extremal Metrics on Toric Manifolds

盛利
四川大学

An example of Apostolovet al. indicate that the condition of K-stability may not be correct one for general polarised manifolds. Szekelyhidi modified definition of K-stability by filtration and stated a variant of the Yau-Tian-Donaldson conjecture. We will talk about our proof of this variant of YTD conjecture for toric manifolds and homogeneous toric bundles. This is jointed with Li An-Min and Lian Zhao.

Dirichlet problem for Krylov type equation in Riemannian geometry

盛为民
浙江大学

In this talk, I shall introduce a class of nonlinear elliptic equations in the Krylov type, which can be viewed as a generalization of the Hessian equation. As applications, I shall talk about studying a Plateau type problem for locally convex Weingarten hypersurfaces and the Dirichlet problem for a modified Schouten tensor in the smooth closed Riemannian manifold with smooth boundary. This talk bases on the joint works with Dr Shucan Xia and Ms Xinying Liu.

H-invariant revisited

田刚
北京大学

The H-invariant was introduced to compute Perelman's entropy along Kahler-Ricci flow. It is actually the logarithm of an earlier invariant of Tian-Zhu. In this talk, I will start with some basics on Kahler manifolds and H-invariant, then I will discuss some recent studies on this invariant and its variances.

Free boundary minimal hypersurfaces in locally wedge-shaped manifolds

王童瑞
西湖大学

Given a compact Riemannian manifold M^{n+1} with smooth boundary ∂M, a free boundary minimal hypersurface (FBMH) in M is a critical point for the area functional with respect to the variations that constrain its boundary to lie in ∂M but be otherwise free to vary. When the ambient manifold M has a stratified singular structure (e.g. a polyhedron), a natural question is whether there is a FBMH in M with a compatible stratified singular structure (e.g. a minimal polygon whose k-skeleton lies in M's (k+1)-skeleton). In this talk, I will introduce related concepts of FBMHs in a class of spaces we call locally wedge-shaped manifolds, whose boundaries are formed by faces and edges. By extending Almgren-Pitts min-max theory, we show the existence of a $C^{2,\alpha}$ FBMH in any locally wedge-shaped manifolds of dimension $3 \leq n+1 \leq 6$ with either acute wedge angle or right wedge angle coupled with a certain additional assumption. This talk is based on the joint work with Liam Mazurowski.

Some progress on Llarull's theorem and its generalizations

王相生
山东大学

Llarull's theorem is a beautiful result about the scalar curvature obtained by the index theory method. I will review some recent results about the generalization of Llarull's theorem and a new proof of Llarull's theorem in the odd dimensional case, which are joint works with Yihan Li, Guangxiang Su and Weiping Zhang.

The prescribed curvature problem in Minkowski space

王志张
复旦大学

In this talk, we discuss the existence of smooth, entire, strictly convex, spacelike, prescribed σ_k curvature hypersurfaces in Minkowski space. We further consider the related curvature flow in Minkowski space.

Bernstein theorem in minimal surface theory

忻元龙
复旦大学

We review our efforts to develop the theory of minimal submanifolds in the aspects of Bernstein problem.

Curved Versions of the Ovsienko-Redou Operators

袁伟
中山大学

In the study of conformal geometry, it is fundamental understand the conformal invariant operators involves in various of problems. For example, the well-known conformal Laplacian plays a key role in the study of Yamabe problem. Inspired by the construction of GJMS operators, we completely classify the tangential bidifferential operators on the ambient space and gives a curved analogue of the classification, due to Ovsienko–Redou and Clerc, of conformally invariant bidifferential operators on the sphere. This is a joint work with Jeffrey S. Case from Penn State University and Yueh-Ju Lin from Wichita State University.

Recent Developments in Constant Mean Curvature Hypersurfaces

周鑫
康奈尔大学

We will survey some recent existence theory of closed constant mean curvature hypersurfaces using the min-max method. We hope to discuss some old and new open problems on this topic as well.

参会人员名单（按照姓氏拼音排名）：

蔡雨雷	同济大学
陈大广	清华大学
陈泓宇	四川大学
陈群	武汉大学
陈世炳	中国科学技术大学
陈曦	复旦大学
陈小杨	同济大学
陈学长	南京大学
陈中庆	复旦大学
陈卓博	复旦大学
程亮	华中师范大学
楚健春	北京大学
戴先涌	上海交通大学
邓鹏善	复旦大学
邓宇星	北京理工大学
丁琪	复旦大学
傅吉祥	复旦大学
高瑞	上海交通大学
高睿	复旦大学
葛化彬	中国人民大学
葛建全	北京师范大学
葛武军	复旦大学
郭洪欣	温州大学
韩邦先	山东大学
韩小利	清华大学
韩英波	信阳师范大学
何跃	南京师范大学
洪寒	北京交通大学

贾志威	复旦大学
简旺键	中国科学院
蒋辉宏	上海师范大学
李畅	中国人民大学
李海中	清华大学
李嘉禹	中国科学技术大学
李晋	上海大学
李骏	复旦大学
李明昊	复旦大学
李奇睿	浙江大学
刘博	华东师范大学
刘钢	华东师范大学
刘慧敏	复旦大学
刘佳伟	南京理工大学
刘双奇	同济大学
刘小博	北京大学
刘义威	上海交通大学
刘芝鸣	上海交通大学
刘子涵	同济大学
鲁新宝	复旦大学
路娟玲	华东师范大学
马金韬	复旦大学
马翔	北京大学
毛井	湖北大学
莫小欢	北京大学
欧剑宇	厦门大学
欧丽	四川大学
潘生亮	同济大学
彭鹏	复旦大学

邱红兵	武汉大学
戎小春	首都师范大学
沈良明	北京航空航天大学
沈伟明	首都师范大学
盛利	四川大学
盛为民	浙江大学
石雨昂	上海交通大学
舒焱	同济大学
孙林林	广西师范大学
田刚	北京大学
王常亮	同济大学
王高明	丘成桐数学科学中心
王宏玉	扬州大学
王侃	复旦大学
王丽涵	California State University
王鹏	福建师范大学
王思璐	江南大学
王童瑞	西湖大学
王文龙	南开大学
王险峰	南开大学
王相生	山东大学
王小六	东南大学
王煜	复旦大学
王志超	复旦大学
王志张	复旦大学
王子君	上海交通大学
韦勇	中国科学技术大学
吴彬	复旦大学
吴沛毅	复旦大学

吴鹏	同济大学
席东盟	上海大学
夏超	厦门大学
忻元龙	复旦大学
熊革	同济大学
胥世成	首都师范大学
徐鹏飞	同济大学
徐兴旺	南京大学
许明	首都师范大学
许小卫	中国科学技术大学
彦文娇	北京师范大学
杨翎	复旦大学
杨万旭	北京大学
杨义虎	上海交通大学
姚天洋	同济大学
易承扬	同济大学
游弘皓杰	四川大学
袁伟	中山大学
张德凯	上海大学
张会春	中山大学
张磊	复旦大学
张青松	同济大学
张世金	北京航空航天大学
张希	南京理工大学
张银	四川大学
张永胜	首都师范大学
张振雷	首都师范大学
郑雷	北京大学
郑宇	华东师范大学

周斌	北京大学
周恒宇	重庆大学
周杰	首都师范大学
周武斌	同济大学
周鑫	美国康奈尔大学
周行建	厦门大学
朱保成	陕西师范大学
朱锦天	西湖大学
朱晶泽	MIT
朱萌	华东师范大学
朱苗苗	上海交通大学