广西师范大学数学与统计学院
College of Mathematics and Statistics in Guangxi Normal University

广西师大 2024 年微分几何研讨会

会议手册

2024 年 4 月 11 日至 15 日 · 广西桂林

目录

1 基本信息

交通指引	
住宿地点	桂林漓江大瀑布饭店 · 桂林市杉湖北路一号
桂林两江机场	距离桂林漓江大瀑布饭店约 29 公里，乘坐出租车，约 50 分钟
桂林站	距离桂林漓江大瀑布饭店约 3 公里，乘坐出租车，约 15 分钟
桂林北站	距离桂林漓江大瀑布饭店约 8 公里，乘坐出租车，约 25 分钟
桂林西站	距离桂林漓江大瀑布饭店约 13 公里，乘坐出租车，约 35 分钟
会议简介	
学术委员会主席	田刚
学术委员会委员	陈群、李嘉禹、朱熹平、朱小华
报告人	邓宇星、韩骥原、黄立鼎、黄显涛、黎俊彬、刘钢、刘佳伟、邱红兵、孙俊、万方舒、王童瑞、张科伟、周胜铉、朱锦天
主持人	楚健春、丁琪、葛建全、江文帅、刘磊、刘世平、盛利、盛为民、王险峰、王志张、夏超、徐兴旺、张希、张振雷
会议日程	4 月 11 日报到，12 至 14 日研讨会，15 日离会
会议地点	桂林漓江大瀑布饭店
会议费用	本次会议不收取会务费，食宿及差旅等费用敬请自理。
组织委员会	陈正茂、黄荣里、蒋作海、欧乾忠、孙林林、尹佳斌、张映辉
联系人	孙林林 sunlinlin@gxnu.edu.cn、尹佳斌 jiabinyin@126.com
举办单位	广西师范大学
致谢	广西师范大学数学与统计学院

2 日程安排

4 月 11 日，桂林漓江大瀑布饭店			
时间	内容		地点
14:00-22:00	报到		一楼大厅
18:30-21:00	自助晚餐		二楼咖啡厅
4 月 12 日，四楼漓江厅			
开幕式			
时间	主持人		事项
8:30-8:45	张映辉		校领导及专家代表致辞
8:45-8:55			合影
学术报告			
时间	主持人	报告人	报告题目
9:00-9:45	徐兴旺	刘钢	Complete Kähler manifolds with nonnegative Ricci curvature
9:45-10:15			茶歇
10:15-11:00	盛为民	黄显涛	Transformation theorems for almost splitting maps and some applications
11:05-11:50	葛建全	朱锦天	Positive scalar curvature metrics and aspherical summands
12:00-14:30			自助午餐（二楼咖啡厅）、午休
14:30-15:15	盛利	刘佳伟	Singular Ricci flows on Kähler manifold
15:20-16:05	王险峰	张科伟	Comparison geometry of positively curved Kähler manifolds

16:05-16:35			茶歇
16:35-17:20	刘世平	邱红兵	Bernstein type theorems of ancient solutions to the mean curvature flow in higher codimension
17:25-18:10	夏超	王童瑞	Free boundary minimal hypersurfaces in locally wedge-shaped manifolds
18:30-21:00			晚宴（二楼漓江轩）
4 月 13 日，四楼漓江厅			
时间	主持人	报告人	报告题目
9:00-9:45	江文帅	黎俊彬	Perturbing naked singularities in Einstein-matter field system
9:45-10:15			茶歇
10:15-11:00	张希	孙俊	Singularities of symplectic mean curvature flow
11:05-11:50	楚健春	黄立鼎	The stability of generalized Kähler Ricci Flow on toric Fano manifolds
12:00-14:30			自助午餐（二楼咖啡厅）、午休
14:30-15:15	丁琪	邓宇星	Rigidity of positively curved steady ricci solitons on manifolds and orbifolds
15:20-16:05	王志张	韩骥原	An introduction to the optimal degeneration of Fano varieties
16:05-16:35			茶歇
16:35-17:20	刘磊	万方舒	Qualitative properties of nonnegative solutions for the fourth order equation with conical metrics
17:25-18:10	张振雷	周胜铉	Examples of Ricci limit spaces with infinite holes
18:10-18:25	李嘉禹		学术研讨会闭幕式暨漓江论坛开幕式

18:30-21:00	自助晚餐（二楼咖啡厅）
	4 月 14 日
时间	事项
8:00-18:00	漓江论坛
18:30-21:00	自助晚餐（二楼咖啡厅）
	4 月 15 日
时间	事项
8:00-	自由讨论，离会

3 报告信息

报告人 邓宇星（北京理工大学）

题目 Rigidity of positively curved steady ricci solitons on manifolds and orbifolds

摘要 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.

报告人 韩骥原（西湖大学）

题目 An introduction to the optimal degeneration of Fano varieties

摘要 In this talk, I will go through some recent developments over the optimal degeneration of Fano varieties. Given a Fano variety X, there exists a two-step degeneration procedure to produce a weighted K-polystable variety X'. The degeneration is optimal in the sense that it is the minimizer of an algebraic invariant. In addition, there exists a (unique) singular Kähler Ricci soliton metric on X'. The degeneration procedure is essential an algebraic analogue of the Hamilton-Tian conjecture for the Kähler Ricci flow.

报告人 黄立鼎（厦门大学）

题目 The stability of generalized Kähler Ricci Flow on toric Fano manifolds

摘要 To construct canonical metrics and understand existence and moduli problems in generalized Kähler geometry, Streets-Tian introduce the generalized Kähler-Ricci flow. We will study the stability of generalized Kähler Ricci Flow on toric Fano manifolds.

报告人 黄显涛（中山大学）

题目 Transformation theorems for almost splitting maps and some applications

摘要 The almost splitting map is a powerful tool in studying manifolds with Ricci curvature uniformly bounded from below and their Gromov-Hausdorff limits. In this talk, we will introduce a transformation theorem for almost splitting maps, generalizing the one obtained by Cheeger, Jiang and Naber, to possibly collapsed manifolds. We will also introduce some applications of this transformation theorem, one of which is a new smooth fibration theorem. More precisely, we introduce a notion, called the generalized Reifenberg condition, under which we prove a smooth fibration theorem for collapsed manifolds with Ricci curvature lower bound. This gives a unified proof of smooth fibration theorems in many previous works, including the classical ones by Fukaya and Yamaguchi respectively. Some other applications of the transformation theorem will be introduced in this talk. This talk is based on my joint work with Hongzhi Huang.

报告人 黎俊彬（中山大学）

题目 Perturbing naked singularities in Einstein-matter field system

摘要 The instability of naked singularities are related to the weak cosmic censorship conjecture, one of the fundamental conjectures in general relativity. In this talk, we will revisit the former works on the construction and instability of naked singularities in spherical symmetry. We will also show that how to produce instability of these naked singularities using gravitational perturbations (outside spherically symmetry). The instability mechanism of some of these naked singularities are not known before even in spherical symmetry.

报告人 刘钢（华东师范大学）

题目 Complete Kähler manifolds with nonnegative Ricci curvature

摘要 We discuss some recent results on complete Kähler manifolds with nonnegative Ricci curvature:

1. the invariance of average of scalar curvature at infinity,
2. boundedness of integral of higher power of Ricci curvature, and
3. am rigidity result for Kähler Ricci flat metrics.

报告人 刘佳伟（南京理工大学）

题目 Singular Ricci flows on Kähler manifold

摘要 In this talk, I will recall some results on conical Kähler-Ricci flow, and then talk about the existence and uniqueness of cusp Kähler-Ricci flow, which is obtained as the limiting flow of conical Kähler-Ricci flows as cone angle tends to 0. This is a joint work with Professor Xi Zhang.

报告人 邱红兵（武汉大学）

题目 Bernstein type theorems of ancient solutions to the mean curvature flow in higher codimension

摘要 In this talk, we shall discuss ancient solutions to the mean curvature flows. By carrying out refined curvature estimates, we prove better Bernstein type 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.

报告人 孙俊（武汉大学）

题目 Singularities of symplectic mean curvature flow

摘要 We will talk about our progress on the study of singularities of symplectic mean curvature flow, especially on symplectic translating solitons. This talk is based on joint work with Professor Xiaoli Han and Jiayu Li.

报告人　万方舒（安徽大学）

题目　Qualitative properties of nonnegative solutions for the fourth order equation with conical metrics

摘要　In this talk, qualitative properties of nonnegative solutions of weighted fourth order elliptic problems arising from the equations on singular manifolds with conical metrics are studied. The weights may be singular in the domains. We obtain the Bôcher-type theorems and present the sharp characterization of the asymptotic behavior at the isolated singularities of solutions for the fourth order equation with conical metrics. Some existence and non-existence results for weighted fourth order elliptic problems with Navier and Dirichlet boundary values in exterior domains are also discussed.

报告人　王童瑞（西湖大学）

题目　Free boundary minimal hypersurfaces in locally wedge-shaped manifolds

摘要　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.

报告人　张科伟（北京师范大学）

题目　Comparison geometry of positively curved Kähler manifolds

摘要 We will talk about the comparison geometry of positively curved Kähler manifolds, emphasize its difference from the classical Riemannian case and point out its interesting relation with the Yau-Tian-Donaldson conjecture. We will focus on volume comparison, diameter comparison and eigenvalue comparison in the Kähler setting. Some recent progress will be presented. This talk is partly based on the joint work with Jianchun Chu and Feng Wang.

报告人 周胜铉（北京大学）

题目 Examples of Ricci limit spaces with infinite holes

摘要 In this talk, we will describe how to construct n-dimensional Ricci limit space ($n \geq 3$) has no open subset which is topologically a manifold. This generalizes Hupp-Naber-Wang's result. As a corollary, our example gives a collapsed sequence of boundary free manifolds so that the limit has dense boundary with an infinite number of connected components.

报告人 朱锦天（西湖大学）

题目 Positive scalar curvature metrics and aspherical summands

摘要 In this talk, we consider obstruction for complete positive scalar curvature metrics on the aspherical summands $N\#X$ in dimensions up to five, where N is a closed aspherical manifold and X is an arbitrary non-compact manifold. We start by recalling related backgrounds as well as the slice-and-dice argument by Chodosh and Li, and then we show how to prove our main theorem with their techniques after introducing several essential improvements. This work is joint with Dr. Shuli Chen from Stanford University and Prof. Jianchun Chu from Peking University.

4 广西师范大学数学与统计学院简介

弦歌不辍，薪火相传。广西师范大学数学与统计学院肇始于 1932 年 10 月创办的广西省立师范专科学校数学组（科），前身是 1943 年的国立桂林师范学院数理化专修科。学院曾“三度调整、八次迁址、十次更名”。几代人励精图治，辛勤耕耘，使学院积累了深厚的文化底蕴。2013 年，学院更名为数学与统计学院，弄潮逐梦新征程。

学院现拥有数学、统计学两个一级学科硕士学位授权点，课程与教学论二级学科硕士学位授权学科，学科教学（数学）、应用统计学两个专业硕士学位授权点。开设有数学与应用数学、信息与计算科学、统计学三个全日制普通本科专业，其中，数学与应用数学、统计学入选国家级一流本科专业建设点，数学与应用数学专业是教育部第四批高等学校特色专业建设点、广西高等学校优质专业、广西高等学校特色专业及课程一体化建设项目 (优势专业) 立项专业，通过了教育部师范类第二级专业认证。基础数学、应用数学是广西重点学科。《概率论》入围国家级一流课程，《高等代数与解析几何》《现代数学教育技术》入围自治区级一流课程。近年来，学院教师获国家、自治区基础教育教学成果奖、自治区高等教育教学成果奖 10 余项。

学院以一流的科研平台打造科研高地，培育集聚人才。学院拥有广西应用数学中心和 2 个广西高校重点实验室。广西统计专业硕士研究生联合培养基地、广西统计干部教育培训基地、广西普通高中数学学科基地、广西 21 世纪园丁工程中学数学学科教育教学研究基地、桂林市数学学会和桂林数学课栈青少年发展服务中心等 6 个基地、学会挂靠在学院。

学院高度重视高层次人才队伍建设，师资力量雄厚。现有教职工 109 人，其中专任教师 90 人，外籍教师 1 人，专任教师高级职称比例超 55%，博士学位教师比例超 75%。教师中有国务院政府特殊津贴专家、全国优秀教师、广西终身教授、广西优秀专家、广西十百千人才工程第二层次人选、广西青年拔尖人才等各类称号 30 余人次。

学院的主要研究方向有偏微分方程、微分几何与几何分析、代数与组合设计、常微分方程与动力系统、非线性复杂系统分析与控制等。近五年来，学院取得一些高水平的研究成果，在国际重要学术期刊Adv. Math.、Math. Ann.、Calc. Var. Partial Differential Equations、Math. Z.、J. London Math. Soc.、J. Algebra、Nonlinearity、IEEE和SIAM系列期刊等发表论文。承担了一大批科研项目，其中国家自然科学基金 28 项，广西杰出青年基金 4 项。

秉持“秉德知数精统持正”的院训和“严谨治学务实求新和合致远”的办学精神，学院为广西乃至全国培养了近 2 万名毕业生，其中大学校长数 10 人、教育部长江学者 1 人、国家千人计划 2 人、万人计划 1 人、八桂学者 3 人。他们成为各行业的骨干，为教育发展、经济建设和社会进步做出了重要的贡献。学生发表多篇高水平学术论文，在数学建模、数学竞赛、市场调查与分析大赛、全国“东芝杯”理科师范生创新大赛、全国师范生教学技能大赛、全区师范生教学技能大赛、中国国际“互联网 +”大学生创新创业大赛广西赛区选拔赛、“挑战杯”广西大学生课外学术科技作品竞赛等各类学术科技竞赛上屡获佳绩。

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会议笔记