

2017 南京青年几何分析学者会议

2017 年 11 月 25-26 日

南京大学数学系及现代数学研究所

地点：南京大学现代数学研究所 蒙民伟楼 1105 室

会议日程：

时间	报告人	题目
11 月 25 日		
9:00-9:50	朱苗苗	Pohozaev type constants and applications in geometric analysis
9:50-10:20	茶歇	
10:20-11:10	钟景洋	Scalar conformal invariants and higher order Willmore energy for hypersurfaces in S^{n+1}
11:10-12:00	费明稳	Sharp interface limit of isotropic-nematic two phase flow for liquid crystals
12:00-14:00	午餐（南苑餐厅）	
14:00-14:50	Pak Tung Ho	Ricci-Bourguignon flow
14:50-15:20	茶歇	
15:20-16:10	王芳	Asymptotically hyperbolic Einstein manifolds and scattering theory
16:10-17:00	王坤博	Convergence of the CR Yamabe Flow
18:00	晚餐（南苑餐厅）	
11 月 26 日		
9:00-9:50	丁冰冰	Blowup of 3-D quasilinear wave equations
9:50-10:20	茶歇	
10:20-11:10	陈志杰	On the curvature equation with four singular sources on rectangular tori
11:10-12:00	袁伟	Q-curvature in Riemannian Geometry - From Scalar Curvature to CVI
12:00-14:00	午餐（南苑餐厅）	
14:00-14:50	熊金钢	On the isoperimetric quotient over scalar-flat conformal classes
14:50-15:20	茶歇	
15:20-16:10	王军	Classification of totally real minimal two-spheres S^2 into a hyperquadric Q_n
17:30	晚餐（南苑餐厅）	

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(1) 陈志杰 (清华大学)

Title: On the curvature equation with four singular sources on rectangular tori

Abstract: I will introduce some recent advances on the curvature equation with four singular sources

$$\Delta u + e^u = 8\pi \sum_{k=0}^3 n_k \delta_{\omega_k/2} \text{ on } E_r, \quad n_k \in \mathbb{N},$$

where E_r is a flat torus and $\delta_{\omega_k/2}$ is the Dirac measure at the half period $\omega_k/2$'s. The solvability of this equation depends essentially on the geometry of E_r and is challenging from the PDE point of view. I will mainly introduce a sharp nonexistence result for rectangular tori. This is based on a joint work with Professor Chang-Shou Lin.

(2) 丁冰冰 (南京师范大学)

Title: Blowup of 3-D quasilinear wave equations

Abstract: In this talk, we focus on the 3-D quasilinear wave equation

$$-\partial_t^2 \phi + \operatorname{div} \left(\frac{\nabla \phi}{\sqrt{1 + |\nabla \phi|^2}} \right) = 0 \quad (1)$$

with large data. It is well-known that (1) satisfies the classical null condition, and hence it has global existence for small data. But if we constrict the data to be large with special form, which are called “short pulse data” introduced by D. Christodoulou, we can see that

a shock will appear since the incoming characteristic hypersurfaces collapse. This is a joint work with Professor Huicheng Yin.

(3) 费明稳 (安徽师范大学)

Title: Sharp interface limit of isotropic-nematic two phase flow for liquid crystals

Abstract: We consider the singular limit of solutions to the Landau-de Gennes ow for liquid crystals at the critical temperature, which can be also viewed as the special but important case of the general Rubinstein-Sternberg-Keller problem. Our method is based on the matched asymptotic expansion in the transition layer and the Hilbert expansion in the bulk regions.

(4) Pak Tung Ho (Sogang University, Korea)

Title: Ricci-Bourguignon flow

Abstract: In this talk, I will talk about the Ricci-Bourguignon flow. I will mention some properties and results related to the Ricci Bourguignon flow.

(5) 王芳 (上海交通大学)

Title: Asymptotically hyperbolic Einstein manifolds and scattering theory

Abstract: In this talk, I will mainly introduce the scattering theory for asymptotically hyperbolic Einstein manifolds. As a continuation of Guillarmou-Qing's work, we will mainly show the positivity of those scattering operators of order between 2 and 4 by assuming certain geometric conditions on the conformal infinity. We also give an application of the positivity result to the quotient case to compute the Hausdorff dimension of the limit set. At last, a complex version of the story, the scattering theory for asymptotically complex hyperbolic Einstein manifolds and its positivity results, will also be given.

(6) 王军 (南京师范大学)

Title: Classification of Totally Real Minimal Two-spheres S^2 into A Hyperquadric Q_n

Abstract: To study the classification of minimal immersion $F : S^2 \rightarrow Q_n$, $n \geq 2$, we introduce an "inclusion map angle" measuring the minimality of $i \circ F : S^2 \rightarrow \mathbb{C}\mathbb{P}^{n+1}$, where $i : Q_n \rightarrow \mathbb{C}\mathbb{P}^{n+1}$ is the standard inclusion, which is minimal but not totally geodesic. By the inclusion map angle, totally real minimal immersions F with both constant curvature and constant inclusion map angle are completely classified constant, and all of them are homogenous.

(7) 王坤博 (浙江大学)

Title: Convergence of the CR Yamabe Flow

Abstract: The CR Yamabe problem is to find a conformal contact form such that its Webster scalar curvature is constant. One way to solve the CR Yamabe problem is using the CR Yamabe flow. In this talk, I will introduce some main results of the CR Yamabe flow and present our recent work on the convergence of the CR Yamabe flow on a three dimensional CR manifold. This is joint work with Pak Tung Ho and Weimin Sheng.

(8) 熊金钢 (北京师范大学)

Title: On the isoperimetric quotient over scalar-flat conformal classes

Abstract: Let (M, g) be a smooth compact Riemannian manifold of dimension n with smooth boundary ∂M . Suppose that (M, g) admits a scalar-flat conformal metric. We prove that the supremum of the isoperimetric quotient over the scalar-flat conformal class is strictly larger than the best constant of the isoperimetric inequality in the Euclidean space, and consequently is achieved, if either (i) $n \geq 12$ and ∂M has a nonumbilic point; or (ii) $n \geq 10$, ∂M is umbilic and the Weyl tensor does not vanish at some boundary point. This is joint with Tianling Jin.

(9) 袁伟 (中山大学)

Title: Q-curvature in Riemannian Geometry - From Scalar Curvature to CVI

Abstract: Q-curvature as a generalization of Gaussian curvature has been studied extensively for years in the research of conformal geometry. In fact, as a Riemannian geometric object, it shares many similarities with scalar curvature, which seems not being noticed until recent researches. On the other hand, Q-curvature is a very important intermediate scalar-type curvature, which gives us many hints for the study of higher-order Riemannian invariants. In this talk, we will clarify the interesting connections between scalar curvature, Q-curvature and more generally, CVIs (conformally variational Riemannian invariants).

(10) 钟景洋 (清华大学)

Title: Scalar conformal invariants and higher order Willmore energy for hypersurfaces in S^{n+1}

Abstract: For a hypersurface in S^{n+1} , we use the conformal Gauss map and the conformal transform to construct the associate hypersurface in $R^{1,n+2}$, build up a way to construct and collect scalar conformal invariants. By calculation of special invariant of the associate hypersurface, we set up a new global conformal invariant, which could be considered as generalized Willmore energy in higher order.

(11) 朱苗苗 (上海交通大学)

Title: Pohozaev type constants and applications in geometric analysis

Abstract: In this talk, we shall discuss the notion of Pohozaev type constants associated to solutions of some elliptic systems in dimension two and explore their applications in geometric analysis.