Workshop on Nonlinear Partial Differential Equations XXIX

--- 上海交通大学 & 上海师范大学

April 10-13, 2026

Program

2. 会议安排

注册

时间：　　年　月　　日　　，之后可在会场签到

报告

时间：　　年　月　　日　　日

地点：建国宾馆九州厅 '（四楼），上海市徐汇区漕溪北路　　号

住宿

建国宾馆，上海市徐汇区漕溪北路　　号

联系

杨辉
卓然

、

3. 会议日程

4 月 11 日，周六

时间	报告	主持
	开幕式致辞	
	张志涛 8 QLIRUP JOREDO/ LSVFKLV]VERXQGVRI VROXWRQVVR QRQOQHDU 6FKURGLQJHUV\ VWVP VZLWK VWURQJ FRP SHWWRQ	**曹道民**
	唐先华 / L/ LQ公开问题的研究进展	**邹文明**
	茶歇	
	窦井波 $ VKDUS DQLVRWURSLF 2 QRIULLQHTXDOLW DQG/ LRXYLOOH VKHRUHP IRUDQLVRWURSLF S / DSODFLDQ HTXDWRQVLQ ¼Ò	**刘春根**
	姚若飞 8 QLTXHQHVVRI FULWFDOSRLQWVRI VKH VHFRQG 1 HXP DQQ HLJHQIXQFWRQVRQ WLDQJOHV	**郭玉霞**
	午餐（建国宾馆）	
	彭锐 7KH SULQFLSDOHLJHQYDOXHRI DQDJH VWXFWXUHG RSHUDWRU ZLWK GLIIXVLRQ DQG DGYHFWRQ TXDOLWDWLYH DQDOVLV DQG DQ DSSOLFDWRQ	**杨孝平**
	陈志杰 6ROYDELOLW RI FXUYDWXUH HTXDWRQVRQ VRUXVYLD 3 DLQOHYH 9, HTXDWRQV	**郭玉劲**
	茶歇	
	罗鹏 7KH FULWFDOSRLQWVRI 5 RELQIXQFWRQ DQG. LUFKKRII 5 RXWK IXQFWRQ	**王俊**
	杨文 2 Q%UH]LV ILUWWRSHQ SUREOHP DFRP SOHWH VROXWRQ	**娄本东**
	晚宴（建国宾馆）	

4 月 12 日，周日

时间	报告	主持
	李福义 $ CRFDOYDCOH\ VKHRUHP DQGLWVDSSOLFDWRQVVRHOODSWF HTXDWRQVRQERXQGHGGRPDLQV	桂长峰
	戴蔚 1 RQ UDGLDOVROXWRQVIRUVKHFULWFDOTXDVL OLQHDU+ HQRQ HTXDWRQ	严树森
	茶歇	
	唐岚 2 QVKH0 RQJH$P SqUHHTXDWRQV	熊金钢
	王春花 4 XDQWDWDWYHSURSHUWHVRI VKH+ DUG\ WVSHP HDQILHOG HTXDWRQ	赵富坤
	午餐（建国宾馆）	
	鲁建 6RP HH[LWMQFHDQGQRQXQLTXHQHVVUHVXOWRQ0 LQNRZVNL WVSHSUREOHPV	韩丕功
	向长林 5HJXODULWVKHRU\ RI IUDFWRQDOKDUP RQLF P DSV	李从明
	茶歇	
	陈洪葛 6RERCHYLQHTXDOWVDQGLWVH[WHP DOIXQFWRQVIRU KRP RJHQHRXV+ | UP DQGHUYHFWRUILHOGV	谢春景
	杨辉 / LRXYLOOHVKHRUHP VIRUFRQIRUP DO4 FXUYDWXUHHTXDWRQV	卓然
	晚餐（建国宾馆）	

4. 题目与摘要

Sobolev inequality and its extremal functions for homogeneous Hörmander vector fields

陈洪葛（华中师范大学）

In this talk, we will discuss the Sobolev inequalities related to homogeneous Hörmander vector fields. Furthermore, we show that the optimal Sobolev constant is attained under a broad algebraic condition. This result holds for general homogeneous Hörmander vector fields particularly in non-equiregular degenerate cases, significantly extending the analysis beyond a specific class of Grushin-type vector fields. This is joint work with Prof. Hua Chen and Dr. Jin-Ning Li.

Solvability of curvature equations on torus via Painleve VI equations

陈志杰（清华大学）

In this talk, I will introduce some results about the curvature equation with multiple singular sources on torus. This is known as a critical case for which the apriori estimate does not hold, and the existence of solutions has been a long-standing problem. By establishing a deep connection with Painleve VI equations, we show that the existence of even solutions depends on the location of the singular point p, and we give a sharp criterion of p in terms of Painleve VI equations.

Non-radial solutions for the critical quasi-linear Henon equation

戴蔚 (北京航空航天大学)

In this talk, we show the existence of non-radial solutions for the critical quasi-linear Henon equation involving p-Laplace operator ($1 < p <= N$). Our results successfully extend the classical work of F. Gladiali, M. Grossi, and S. L. N. Neves [Adv. Math. 2013] concerning the Laplace operator (i.e., the case $p = 2$) to the more general setting of the nonlinear p-Laplace operator ($1 < p <= N$).

A sharp anisotropic Onofri inequality and Liouville theorem for anisotropic p-Laplacian equations in $\mathbb{R}^n$

窦井波（陕西师范大学）

In this talk, we present a sharp anisotropic Onofri inequality in $\mathbb{R}^n$ and discuss the classification of its extremal function. To this end, we classify solutions to the anisotropic quasi-linear Liouville equation in $\mathbb{R}^n$, which is closely related to the Euler-Lagrange equation of Onofri inequality. In virtue of the invariant tensor technique, we present an alternative approach to establishing the

Serrin-Zou type identity, thereby providing an alternative method for proving the classification results. This is a joint work with Tian Wu and Shuang Yuan.

A local valley theorem and its applications to elliptic equations on bounded domains

李福义（山西大学）

In this paper, we develop a general minimax framework for constrained variational problems, establish a local valley theorem for finding sign-changing critical points of functionals on constraint manifolds, and further give a positive answer to the question concerning the existence of sign-changing normalized solutions for constrained nonlinear elliptic boundary value problems on bounded domains. The abstract results can be applied to study the existence of sign-changing solutions for other constrained problems, and the results for nonlinear elliptic problems extend some existing results in the literature. The results presented here were joint work with Cui Zhang and Zhanping Liang.

Some existence and nonuniqueness results on Minkowski type problems

鲁建（南京理工大学）

Minkowski type problems arise from modern convex geometry and integral geometry. In the smooth case, they are usually equivalent to solving a class of local/nonlocal Monge-Ampere type equations defined on the unit hypersphere. These equations could be degenerate or singular in different conditions. We will talk about some new results on the existence and nonuniqueness of solutions to the dual Minkowski problem and chord Minkowski problem.

The critical points of Robin function and Kirchhoff-Routh function

罗鹏（华中师范大学）

The properties of Robin function and Kirchhoff-Routh function play a very basic role in the study of elliptic equation, fluid mechanics, dynamic system, geometry and topology, etc. However, the property of the critical point is still unclear for large class of domains. In this talk, we give some results on the number of non-degeneracy of critical pints of Robin function and Kirchhoff-Routh function. These are joint work with Francesca Gladiali, Massimo Grossi and Shusen Yan.

The principal eigenvalue of an age-structured operator with diffusion and advection: qualitative analysis and an application

彭锐（浙江师范大学）

In this talk, we will report our recent work on an eigenvalue problem associated with an age-structured operator incorporating random diffusion and advection. Our primary focus is on examining the asymptotic behaviours of the principal eigenvalue with respect to large advection and small or large diffusion rates. We subsequently apply these results to a nonlinear age-structured model, providing a better understanding of how diffusion and advection influence the spatial distribution of species. Among other ingredients, our approach involves constructing various types of super- and sub-solutions to tackle the novel challenges posed by the nonlocal terms in the problems under consideration. This is joint work with Hao Kang (Tianjin University) and Maolin Zhou (Nankai Univeristy).

On the Monge-Ampère equations

唐岚（华中师范大学）

For the obstacle-type problems for the Monge-Ampère equations and linearized Monge-Ampère equations, we establish free boundary regularity results for these problems.

Li-Lin 公开问题的研究进展

唐先华（中南大学）

主要介绍 Li-Lin 公开问题的研究现状及最新进展。

Quantitative properties of the Hardy-type mean field equation

王春花（华中师范大学）

We consider the following Hardy-type mean field equation

$$\begin{cases} -\Delta u - \frac{1}{(1-|x|^2)^2} u = \lambda e^u, & \text{in } B_1, \\ u = 0, & \text{on } \partial B_1, \end{cases}$$

where $\lambda > 0$ is small and B_1 is the standard unit disc of $\mathbb{R}^2$. Applying the moving plane method of hyperbolic space and the accurate expansion of heat kernel on hyperbolic space, we establish the radial symmetry and Brezis-Merle lemma for solutions of Hardy-type mean field equation. Meanwhile, we also derive the quantitative results for solutions of Hardy-type mean field equation, which improves significantly the compactness results for the classical mean field equation obtained by Brezis-Merle and Li-Shafrir. Furthermore, applying the local Pohozaev identity from scaling, blow-up analysis and a contradiction argument, we prove that the solutions are unique when λ goes to zero. This is based on a joint work with Lu Chen and Bohan Wang.

Regularity theory of fractional harmonic maps

向长林（三峡大学）

Fractional harmonic maps are closely related to fractional Ginzburg-Landau equations, harmonic maps with free boundary value, nonlocal minimal surfaces and many other problems in different fields. In this report, I will introduce some recent progress on regularity theory of fractional harmonic maps, inculding partial regularity theory, global regularity theory and singularity analysis. Finally, I will introduce some further important problems to be studied in this field.

Liouville theorems for conformal Q-curvature equations

杨辉（上海交通大学）

In this talk, we consider the non-existence of positive solutions for the following conformal Q-curvature equation

$$(-\Delta)^{\sigma} u = K(x) u^{\frac{n+2\sigma}{n-2\sigma}} \quad \text{in } \mathbb{R}^n,$$

where $\sigma \in (0, n/2)$ is a real number. When $\sigma = 1$, this equation reduces to the well-known scalar curvature equation arising from the prescribed scalar curvature problem. For general $\sigma \in (0, n/2)$, it appears in the study of prescribing Q-curvature. We establish Liouville theorems under various assumptions on the Q-curvature $K(x)$ by developing a unified approach for all $\sigma \in (0, n/2)$. This is a joint work with Meiqing Xu.

On Brezis' first open problem: a complete solution

杨文（澳门大学）

In 2023, H. Brezis published a list of his "favorite open problems", which he describes challenges he had "raised throughout his career and has resisted so far." We provide a complete resolution to the first one-Open Problem 1.1-in Brezis's favorite open problems list: the existence of solutions to the long-standing Brezis-Nirenberg problem on a three-dimensional ball. Furthermore, using the building blocks of Del Pino-Musso-Pacard-Pistoia sign-changing solutions to the Yamabe problem, we establish the existence of infinitely many sign-changing, nonradial solutions for the full range of the parameter.

Uniqueness of critical points of the second Neumann eigenfunctions on triangles

姚若飞（华南理工大学）

In 1974, Rauch proposed the celebrated hot spots conjecture, asserting that the second Neumann eigenfunction attains its global extrema (the hottest and coldest points) exclusively on the boundary of the domain. Notably, for triangular domains T, the absence of interior critical points was recently established by Judge and Mondal (Ann. Math. (2) 195(1):337–362, 2022). In this talk, we will present a complete resolution of several important questions about the second Neumann eigenfunction on triangles. Our proofs combine the continuity method, eigenvalue inequalities, the maximum principle, and the moving plane method. This is a joint work with Prof. Hongbin Chen (XJTU) and Prof. Changfeng Gui (UM).

Uniform global Lipschitz bounds of solutions to nonlinear Schrodinger systems with strong competition

张志涛（中国科学院数学与系统科学研究院）

We study a class of semi-linear elliptic systems of Gross-Pitaevskii type with Dirichlet boundary conditions, and prove that uniform boundedness of the solutions implies their uniform global Lipschitz boundedness as the competition constant goes to infinity, this improves interesting uniform Holder regularity results of Terracini et al.(CPAM, 2010) to the optimal case and cover the one dimension case, here the space dimension can be arbitrary and the domain can be unbounded. We also obtain the uniform interior Lipschitz bounds of the solutions, and develop the result of Soave and Zilio (ARMA, 2015) in a general setting. The proofs are based on blow-up analysis and Alt-Caffarelli-Friedman type monotonicity formulae both in the domain and near the domain boundary(joint with Zexin Zhang).