



丘成桐数学科学中心  
YAU MATHEMATICAL SCIENCES CENTER



# 复几何青年论坛

Young Forum on Complex Geometry

December 26-30, 2025

Room A-103, TSIMF

## 【组织者 ORGANIZERS】

Qionglin Li(李琼玲), Nankai University


Sheng Rao(饶胜), Wuhan University

Xueyuan Wan(万学远), Chongqing University of Technology

Jian Xiao(肖建), Tsinghua University

# Contents

About the conference .....	1
Schedule .....	3
2025 年 12 月 27 日 - 星期六 .....	4
2025 年 12 月 28 日 - 星期日 .....	5
2025 年 12 月 29 日 - 星期一 .....	6
Titles and Abstracts .....	7
王 枫 .....	8
韩骥原 .....	8
欧文浩 .....	8
吴菊杰 .....	8
徐 旺 .....	9
胡佳俊 .....	9
张德凯 .....	9
张润泽 .....	10
陈张弛 .....	10
黄鹏飞 .....	11
沈 洋 .....	11
丁 聪 .....	11
李 超 .....	12
汤 凯 .....	12
蒋天枢 .....	12
Welcome to TSIMF .....	13
About Facilities .....	15
Registration .....	15
Guest Room .....	15
Library .....	16
Restaurant .....	16
Laundry .....	17
Gym .....	17
Swimming Pool .....	17



Free Shuttle Bus Service at TSIMF.....	17
Playground.....	17
Contact Information of Administration Staff .....	18



**关于会议**  
***About the conference***

## 复几何青年论坛

Young Forum on Complex Geometry

### 会议时间

报到日期: 2025 年 12 月 26 日

会议报告: 2025 年 12 月 27-29 日

离会日期: 2025 年 12 月 30 日

### 会议地点

A-103 会议室, 清华三亚国际数学论坛

### 学术委员会

傅吉祥 (复旦大学)

李嘉禹 (中国科学技术大学)

刘克峰 (美国加州大学洛杉矶分校 & 重庆理工大学)

莫毅明 (香港大学)

张伟平 (南开大学)

张希 (南京理工大学)

郑方阳 (重庆师范大学)

周向宇 (中国科学院)

朱小华 (北京大学)

左康 (武汉大学)

### 组织者

李琼玲 (南开大学)

饶胜 (武汉大学)

万学远 (重庆理工大学)

肖建 (清华大学)

### 会议介绍

为加强国内学者,特别是青年学者之间的学术交流,提升我国复几何领域的整体水平,同时促进与相关学科领域的合作,我们于 2025 年 12 月 26 日至 30 日(12 月 26 日报到,12 月 30 日离会),在清华三亚国际数学论坛举办“2025 复几何青年论坛”。

# 会议日程

## Schedule

时间 & 日期	星期六 (12月27日)	星期日 (12月28日)	星期一 (12月29日)
7:30-8:30	Breakfast(60 minutes)		
Chair	肖建	万学远	李琼玲
9:00-9:45	王枫	张德凯	黄鹏飞
10:00-10:45	韩骥原	张润泽	沈洋
10:45-11:15	Group Photo	Coffee Break (30 minutes)	
	Coffee Break		
11:15-12:00	欧文浩 (11:15-12:15)	陈张弛	丁聪
12:00-13:30	Lunch (90 minutes)		
Chair	饶胜	Free Discussion	饶胜
14:00-14:45	吴菊杰		李超
15:00-15:45	徐旺		汤凯
15:45-16:15	Coffee Break		Coffee Break
16:15-17:00	胡佳俊		蒋天枢
17:30-19:00	Dinner (90 minutes)		

## 2025年12月27日 - 星期六

Time	Name	Title
7:30-8:30	Breakfast(60 minutes)	
Chair	肖建	
9:00-9:45	王枫	Stability of Fano spherical varieties
10:00-10:45	韩骥原	On the existence of weighted-cscK metrics
10:45-11:15	Group Photo	
	Coffee Break	
11:15-12:15	欧文浩	凯勒双有理几何
12:15-13:45	Lunch (90 minutes)	
Chair	饶胜	
14:00-14:45	吴菊杰	Equivalence between VMO functions and Zero Lelong number functions
15:00-15:45	徐旺	On the Converse of Prekopa's Theorem and Berndtsson's Theorem
15:45-16:15	Coffee Break	
16:15-17:00	胡佳俊	An algebro-geometric approach to the extremals of log-concave inequalities
17:30-19:00	Dinner (90 minutes)	

2025年12月28日 - 星期日

Time	Name	Title
7:30-8:30	Breakfast(60 minutes)	
Chair	万学远	
9:00-9:45	张德凯	The quaternionic form type Calabi-Yau equation on a compact hyperKahler manifold
10:00-10:45	张润泽	Unobstructed deformations for pairs: a log ddbar lemma
10:45-11:15	Coffee Break (30 minutes)	
11:15-12:00	陈张弛	Distribution of Bounded Sequences and Astorg-Boc Thaler's Question
12:00-13:30	Lunch (90 minutes)	
14:00-14:45	Free Discussion	
15:00-15:45		
15:45-16:15		
16:15-17:00		
17:30-19:00		

## 2025年12月29日 - 星期一

Time	Name	Title
7:30-8:30	Breakfast(60 minutes)	
Chair	李琼玲	
9:00-9:45	黄鹏飞	Symmetric spaces for groups over involutive algebras and applications
10:00-10:45	沈洋	Penrose transformations of automorphic cohomology groups on flag domains
10:45-11:15	Coffee Break (30 minutes)	
11:15-12:00	丁聪	Rigidity of Schubert classes and its application in holomorphic isometry
12:00-13:30	Lunch (90 minutes)	
Chair	饶胜	
14:00-14:45	李超	Gromov-Hausdorff limits and Holomorphic isometries
15:00-15:45	汤凯	On Hermitian manifolds with constant curvature
15:45-16:15	Coffee Break	
16:15-17:00	蒋天枢	Kobayashi-Hitchin correspondence for saturated reflexive parabolic sheaves on Kahler manifolds
17:30-19:00	Dinner (90 minutes)	



**报告题目与摘要**  
***Titles and Abstracts***

## Stability of Fano spherical varieties

王枫  
浙江大学

We define a modified Futaki invariant and give an expression in terms of intersection numbers. We will show the equivalence of different notions of stability and give a stability criterion on  $\mathbb{Q}$ -Fano spherical varieties.

## On the existence of weighted-cscK metrics

韩骥原  
西湖大学

Weighted-cscK metrics provide a universal framework for the study of canonical metrics, e.g., extremal metrics, Kahler-Ricci soliton metrics,  $\mu$ -cscK metrics. In joint works with Yaxiong Liu, we prove that on a Kahler manifold  $X$ , the  $G$ -coercivity of weighted Mabuchi functional implies the existence of weighted-cscK metrics. In particular, there exists a weighted-cscK metric if  $X$  is a projective manifold that is weighted  $K$ -stable for models. We will also discuss some progress on singular varieties.

## 凯勒双有理几何

欧文浩  
中国科学院

我们将介绍最近关于紧凯勒流形上双有理几何的进展，包括有理曲线存在性等问题。这是基于近期和 Das, 傅鑫的合作。

## Equivalence between VMO functions and Zero Lelong number functions

吴菊杰  
中山大学 - 珠海校区

We prove that a plurisubharmonic function on a domain in the complex Euclidean space is a locally VMO (Vanishing Mean Oscillation) function if and only if its Lelong number at each point vanishes. We also give a global version of this result when the boundary of the domain satisfies the interior sphere condition. An example emphasizes the importance of this condition. These equivalences contribute to a better understanding of the behavior of singular plurisubharmonic functions. We end

the paper by discussing the link between the residual Monge-Ampere mass and VMO functions, by providing examples. This is joint work with Severine Biard.

## On the Converse of Prekopa's Theorem and Berndtsson's Theorem

徐旺  
中山大学

Extending the framework of the converse  $L^2$  theory, we establish converse results for Berndtsson's theorem on the plurisubharmonic variation of Bergman kernels, showing that both the plurisubharmonicity of functions and the pseudoconvexity of domains are necessary conditions in twisted senses. We also prove analogous results for Berndtsson's theorem on the positivity of direct images and Prekopa's theorem from convex analysis. This is a joint work with Dr. Hui Yang.

## An algebro-geometric approach to the extremals of log-concave inequalities

胡佳俊  
清华大学

Log-concavity is a ubiquitous phenomenon, yielding fundamental inequalities across diverse areas of mathematics. This naturally leads the problem of characterizing the equality cases. Our focus is the counterpart of this problem in algebraic geometry: the characterization of the extremals of the Khovanskii-Teissier inequality. We provide a complete solution to this problem for semiample divisors. As a key application, this allows us to solve the corresponding problem in convex geometry, providing the characterization of the extremals of the Alexandrov-Fenchel inequalities for rational polytopes. This is joint work with Jian Xiao.

## The quaternionic form type Calabi-Yau equation on a compact hyperKähler manifold

张德凯  
华东师范大学

The form type Calabi-Yau equation was introduced by Fu-Wang-Wu 2010 to find balanced metrics. It is related to the Gauduchon conjecture which has been solved by Székelyhidi-Tosatti-Weinkove. In this talk, we consider the quaternionic form type Calabi-Yau equation on compact Hermitian manifolds. We prove the existence of the smooth solution on a compact hyperKähler manifold. This is a joint work with Prof. Jixiang Fu and Dr. Xin Xu.

## Unobstructed deformations for pairs: a log ddbar lemma

张润泽

武汉大学 & 法国蔚蓝海岸大学

The ddbar-lemma is a powerful tool in complex and algebraic geometry.

In the first part of my talk, I will establish a logarithmic ddbar-type lemma on compact Kähler manifolds for logarithmic differential forms with values in the dual of a pseudo-effective line bundle. In the second part, I will present an application to the work of L. Katzarkov–M. Kontsevich–T. Pantev on unobstructed locally trivial deformations of generalized log Calabi–Yau pairs with weights, extending their projective result to the broader Kähler setting.

## Distribution of Bounded Sequences and Astorg-Boc Thaler's Question

陈张弛

华东师范大学

The existence of wandering domains is an interesting research topic in higher-dimensional complex dynamics, and also an essential difference between higher-dimensional polynomial dynamical systems and the one-dimensional case.

Using a positive integer sequence with exponential growth,  $A - B$  constructed a polynomial skew product map  $P$  in  $C^2$  admitting wandering domains. Two biholomorphic invariants (real numbers)  $\alpha, \beta$  (with  $\alpha > 1$ ) can be defined by the coefficients of  $P$ .  $A - B$  proved that for given  $(\alpha, \beta)$ , if there exists a positive integer sequence  $(n_k)$  such that the phase sequence  $\sigma_k = n_{k+1} - \alpha \cdot n_k - \beta \cdot \ln n_k$  converges, then  $P$  has wandering domains.

This raises the question: For which  $(\alpha, \beta)$  does there exist such a sequence  $(n_k)$  making  $(t_k)$  converge?

$A - B$  showed that  $\alpha$  must be a Pisot number. They also gave a condition for  $\beta$ : if  $\theta = (\beta \cdot \ln \alpha) / (\alpha - 1)$  is rational, then there exists a positive integer sequence  $(n_k)$  such that  $(\sigma_k)$  converges to a periodic point. They posed the question: Is the rationality of  $\theta$  a necessary condition?

In collaboration with Zihao Ye, we gave an affirmative answer to the  $A - B$  problem when  $\alpha$  is an algebraic number.

Furthermore, we studied the conditions for the existence of a positive integer sequence  $(n_k)$  such that  $(\sigma_k)$  converges. Suppose  $\alpha$  is an algebraic number with minimal polynomial  $P(x)$ , then  $P(1) \cdot \theta$  being integer is a necessary condition, and  $P(1) \cdot \theta / \gcd(P(1), P'(1))$  being integer is a sufficient condition.

As an application in dynamical systems, we constructed new polynomial skew product maps with wandering domains.

## Symmetric spaces for groups over involutive algebras and applications

黄鹏飞  
南京大学

Symplectic groups and orthogonal groups over noncommutative involutive algebras provide new way of realizing classical Lie groups. When in particular, the involutive algebra is Hermitian or the complexification of a Hermitian algebra, one can identify the corresponding maximal compact subgroups. This new perspective allows for the realization of various geometric models for the symmetric space of these groups. In this talk, we will try to illustrate such ideas and describe the tangent spaces for each of the models, as well as the application to Higgs bundles. This is a joint work with Kydonakis, Rogozinnikov and Wienhard.

## Penrose transformations of automorphic cohomology groups on flag domains

沈洋  
重庆理工大学

In this talk, I will present recent joint work with Kefeng Liu on the Penrose transformation of automorphic cohomology groups of homogeneous line bundles on flag domains. We construct the Penrose transforms explicitly and identify the geometric and representation-theoretic conditions under which the Penrose transforms are isomorphisms. As an application, we show that higher automorphic cohomology groups of certain line bundles on non-classical flag domain are canonically isomorphic to spaces of automorphic forms on Hermitian symmetric domains. We also propose the problem concerning the arithmetic structure of totally degenerate limits of discrete series (TDLDS) on non-classical flag domains, pointing to further connections with geometric representation theory and Hodge theory.

## Rigidity of Schubert classes and its application in holomorphic isometry

丁聪  
深圳大学

Schubert classes form the additive basis for the homology group of a flag variety. A classical problem in algebraic geometry is to determine the representatives of these Schubert classes. In this talk, we will give several notions of rigidity associated with this problem, along with our recent results. Furthermore, we will discuss the applications of some rigidity results to the study of holomorphic isometries in several complex variables. Part of this talk is based on a joint work with Qifeng Li.

## Gromov-Hausdorff limits and Holomorphic isometries

李超  
南京理工大学

Gromov's precompactness theorem for Riemannian manifolds and its refined versions have a profound impact on differential geometry. In this talk, I will introduce a recent joint work with Claudio Arezzo and Andrea Loi. We established a compactness theorem for complete immersed Kähler submanifolds in a fixed ambient space, and then applied it to study Kähler submanifolds of projective spaces.

## On Hermitian manifolds with constant curvature

汤凯  
浙江师范大学

A long-standing conjecture predicts that a compact Hermitian manifold with constant holomorphic sectional curvature  $\lambda$  is Kähler if  $\lambda \neq 0$  and Chern-flat if  $\lambda = 0$ . We will discuss the validity of this conjecture under additional conditions. Similarly, we study the constant mixed curvature  $C(a,b) = \lambda$ , which is a convex combination of Ricci curvature and holomorphic sectional curvature introduced by Chu-Lee-Tam. We prove that if a compact Hermitian surface with constant mixed curvature  $\lambda$ , then the Hermitian metric must be Kähler unless  $\lambda = 0$  and  $2a+b=0$ . We also consider general  $k$ -mixed curvature for Hermitian manifolds.

## Kobayashi-Hitchin correspondence for saturated reflexive parabolic sheaves on Kähler manifolds

蒋天枢  
中国科学技术大学

In this paper, we study the Kobayashi-Hitchin correspondence in the setting of parabolic sheaves with a simple normal crossing divisor over a compact Kähler manifold using the method of Hermitian-Yang-Mills flow.



**论坛介绍**  
***Welcome to TSIMF***

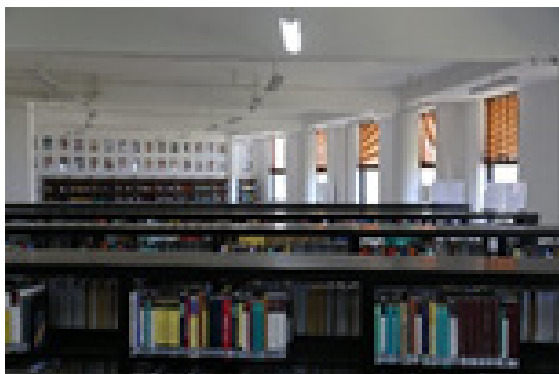


The facilities of TSIMF are built on a 23-acre land surrounded by pristine environment at Phoenix Hill of Phoenix Township. The total square footage of all the facilities is over 29,000 square meter that includes state-of-the-art conference facilities (over 10,000 square meter) to hold many international workshops simultaneously, two reading rooms of library, a guest house (over 10,000 square meter) and the associated catering facilities, a large swimming pool, gym and sports court and other recreational facilities.

Management Center of Tsinghua Sanya International Forum is responsible for the construction, operation, management and service of TSIMF. The mission of TSIMF is to become a base for scientific innovations, and for nurturing of innovative human resource; through the interaction between leading mathematicians and core research groups in pure mathematics, applied mathematics, statistics, theoretical physics, applied physics, theoretical biology and other relating disciplines, TSIMF will provide a platform for exploring new directions, developing new methods, nurturing mathematical talents, and working to raise the level of mathematical research in China.



### Library



**Opening Hours: 09:00am-22:00pm**

TSIMF library is available during the conference and can be accessed by using your room card. There is no need to sign out books but we ask that you kindly return any borrowed books to the book cart in library before your departure.



In order to give readers a better understanding of the contributions made by the Fields Medalists, the library of Tsinghua Sanya International Mathematics Forum (TSIMF) instituted the Special Collection of Fields Medalists as permanent collection of the library to serve the mathematical researchers and readers.

So far, there are 271 books from 49 authors in the Special Collection of Fields Medalists of TSIMF library. They are on display in room A220. The participants are welcome to visit.



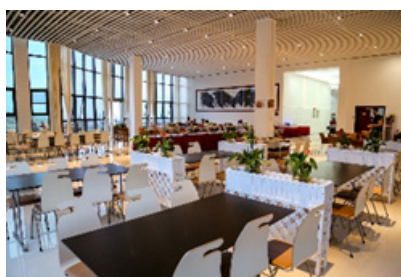
### Restaurant

All the meals are provided in the restaurant (Building B1) according to the time schedule.

**Breakfast 07:30-08:30**

**Lunch 12:00-13:30**

**Dinner 17:30-19:00**



## Laundry

### Opening Hours: 24 hours

The self-service laundry room is located in the Building(B1).



## Gym

### Opening Hours: 24 hours

The gym is located in the Building 1 (B1), opposite to the reception hall. The gym provides various fitness equipment, as well as pool tables, tennis tables etc.



## Playground

Playground is located on the east of the central gate. There you can play basketball, tennis and badminton. Meanwhile, you can borrow table tennis, basketball, tennis balls and badminton at the reception desk.

## Swimming Pool

Please enter the pool during the open hours, swimming attire and swim caps are required, if you feel unwell while swimming, please stop swimming immediately and get out of the pool. The depth of the pool is 1.2M-1.8M.

Opening Hours: 13:00-14:00 18:00-21:00



## Free Shuttle Bus Service at TSIMF

We provide free shuttle bus for participants and you are always welcome to take our shuttle bus, all you need to do is wave your hands to stop the bus.

Destinations: Conference Building, Reception Room, Restaurant, Swimming Pool, Hotel etc.



## Contact Information of Administration Staff

### Location of Conference Affairs Office: Room 104, Building A

Tel: 0086-898-38263896

Conference Affairs :

Sarah 陈媛姗

Tel/Wechat:0086-130-2983-0780

Email: tsimf@tsinghua.edu.cn

Shouxi He 何守喜

Tel/Wechat:0086-186-8980-2225

Email: heshouxi@tsinghua.edu.cn

### Location of Accommodation Affairs Office: Room 200, Building B1

Tel: 0086-898-38882828

Accommodation Manager: Ms. Li YE 叶莉

Tel/Wechat: 0086-139-7679-8300

Email: yel@tsinghua.edu.cn

\*Reception duty hours: 7:00-23:00, chamber service please call: 0086-38882828 (exterior line) 80000 (internal line)

\*Room maintainer night duty hours: 23:00-7:00, if you need maintenance services, please call: 0086-38263909 (exterior line) 30162 (internal line)

### IT

Yuanhang Zhou 周远航

Tel/Wechat: 0086-133-6898-0169

Email: 13368980169@163.com

### Director Assistant of TSIMF

Kai CUI 崔凯

Tel/Wechat: 0086- 136-1120-7077

Email :cuik@tsinghua.edu.cn

### Director of TSIMF

Junpeng Zhu 朱俊鹏

Tel: 0086-136-1113-2615

Email: zjp@tsinghua.edu.cn

清华大学三亚国际论坛管理中心 | 三亚清华数学论坛管理中心

Tsinghua Sanya International Mathematics Forum (TSIMF)



0086-898-38882828

0086-898-38883896



0086-898-38883895



tsimf@tsinghua.edu.cn



572000



<https://tsimf.tsinghua.edu.cn>



海南省三亚市天涯区清华路 100 号, 清华三亚国际数学论坛

No.100, Tsinghua Road, Tianya District, Sanya, Hainan, P. R. China.

