



天元數學國際交流中心

Tianyuan Mathematics Research Center

群表示与相关数学问题研讨会

Workshop on Group Representation and Related
Mathematical Problems

TY-2026-C-017

会议手册

Conference Program

召集人: **Organizers:**

张继平 (北京大学)

刘燕俊 (江西师范大学)

徐行忠 (海南大学)

2026 年 10 月 4 日—10 日

October 4th—10th, 2026

中国·昆明

Kunming, China

天元数学国际交流中心简介

天元数学国际交流中心（以下简称“中心”）成立于 2023 年 7 月，由中国科学院、国家自然科学基金委员会、中国数学会、中国科学院数学与系统科学研究院，以及昆明市有关部门共同支持建设的数学与交叉科学交流机构。旨在搭建数学及其跨学科应用领域的学术交流平台，提升我国数学整体研究水平，成为国际一流的数学交流与合作研究中心。

中心位于昆明市宜良县柴石滩水库库区，三面环山、一面临水，环境优美，海拔约 1700 米。距长水国际机场约 90 公里（车程约 1.5 小时），距石林风景区约 30 公里，距九乡风景区约 20 公里。

中心总建筑面积约 6000 平方米，设有大报告厅（可容纳 100 人，配备高清 LED 屏）、中型会议室 1 间、小型会议室 4 间、研讨/工作室 21 间、图书阅览室 1 间、咖啡厅 1 间。专家楼配有 56 间宿舍及自助洗衣房、公共休息区等配套设施。

中心官方网站：<http://tianyuan.amss.ac.cn/>



Introduction to Tianyuan Mathematics Research Center (TYMRC)

The Tianyuan Mathematics Research Center (established in July 2023) is jointly supported by the Chinese Academy of Sciences, the National Natural Science Foundation of China, the Chinese Mathematical Society, the Academy of Mathematics and Systems Science of the Chinese Academy of Sciences, and relevant departments of Kunming City. It aims to build a platform for academic exchange in mathematics and interdisciplinary applications, enhance China's overall mathematical research level, and become a world-class center for mathematical exchange and collaborative research.

It is located in the national-level public welfare forest in the Chaishitan Reservoir area of Yiliang, Kunming, Yunnan Province, surrounded by mountains on three sides and facing water on one side. The center has a total land area of about 27,000 square meters, with three two-story main buildings, namely the Research Building, the Expert Building and the Logistics Building, which can accommodate nearly 200 people for academic activities, and are equipped with a library and reading room, a restaurant and a certain number of offices and guest rooms.

The center has a total construction area of approximately 6,000 square meters. It features a main lecture hall (capacity: 100 people, equipped with an HD LED screen), one medium-sized seminar room, four small meeting rooms, 21 seminar/workshop rooms, one library and reading room, and one café. The Expert Building is equipped with 56 guest rooms, as well as supporting facilities such as a self-service laundry room and a public lounge.

Official website: <http://tianyuan.amss.ac.cn/>

会议信息

一、研讨主题、内容及意义：

群表示论是一门非常活跃的数学分支，在物理、化学、人工智能等诸多研究领域中发挥重要作用。近年来，表示论持续深入多个数学前沿方向，在李群、代数群、有限域线性群、组合学与代数几何的研究中扮演关键角色。它既是调和分析（含傅里叶分析）的理论基石，也是朗兰兹纲领的核心支撑；著名的 McKay 对应更是连接表示论与代数几何等多个数学领域的重要桥梁。

近年来，有限群表示论局部 - 整体框架下的 Brauer 高零猜想、Robinson 猜想与 McKay 猜想相继得到证明，为这一领域带来新的发展契机。本次研讨会聚焦有限群表示论的国际研究前沿，通过专题集中研讨，致力于攻克著名猜想研究中遇到的关键问题。

本次研讨会既邀请表示论领域的资深学者，也邀请当前活跃的青年研究人员。会议一方面推动前沿研究成果的交流与思想碰撞，另一方面为青年学者搭建良好的学习与互动平台。借助本次高水平学术研讨，与会专家与青年学者有望进一步拓展有限群表示论的研究视野，深化理论认知，推动该领域取得新的突破性进展。

二、活动日程：

报到：2026 年 10 月 4 日

报告：2026 年 10 月 5 日至 10 月 9 日

离会：2026 年 10 月 10 日

地点：天元数学国际交流中心（云南省昆明市宜良县柴石滩水库）

三、相关事项：

1. 本次研讨会得到天元数学国际交流中心资助，参会人员的住宿及餐饮由中心承担，其余费用（含往返交通费）由参会人员自理。
2. 中心统一安排往返昆明高铁站/长水机场及昆明市区的接送服务。
请及时登录项目管理系统（<http://tianyuanpm.amss.ac.cn/>）登记行程信息。
3. 中心距离医院较远，建议访客随身携带一些必备药品。
4. 会议联系人：

刘燕俊（江西师范大学） 电话：15070924503

周 芳（太原师范学院） 电话：15110349175

徐行忠（海南大学） 电话：15207154168

王立中（北京大学） 电话：13699158729

Conference Information

I. Seminar Theme, Content, and Significance:

Representation theory of groups is a vibrant branch of mathematics, playing an important role in numerous fields including mathematics, physics, chemistry and artificial intelligence. In recent years, representation theory has increasingly appeared at the frontiers of mathematics, and it is vital to the study of Lie groups, algebraic groups, matrix groups over finite fields, combinatorics and algebraic geometry. It serves not only as a cornerstone of harmonic analysis (including Fourier analysis) but also as a foundation for the Langlands program; the celebrated McKay correspondence acts as a vital bridge linking representation theory with algebraic geometry and many other areas of mathematics.

In recent years, several major local-global conjectures in the representation theory of finite groups — Brauer's Height Zero Conjecture, Robinson's Conjecture and McKay Conjecture — have been successively proven, marking a new era of development for group representation theory. This workshop focuses on the international research frontiers of the representation theory of finite groups. Through focused discussions, we aim to tackle key problems arising from the study of these famous conjectures.

The workshop will host both senior scholars in representation theory and highly active mid-career and young researchers. It seeks to facilitate exchanges of cutting-edge research findings and intellectual interactions, while offering an excellent platform for young scholars to learn and interact. We anticipate that this high-level academic event will help participating experts and young researchers further broaden their research horizons, deepen the theoretical understanding of finite group representation theory, and drive new breakthroughs in related research.

II、 Program Schedule:

Check-in: October 4th, 2026

Talks: October 5th – 9th, 2026

Departure: October 10th, 2026

Venue: Tianyuan Mathematics Research Center (Chaishitan Reservoir, Yiliang County, Kunming, Yunnan Province)

III、 Practical Information:

1. This seminar is financially supported by the TYMRC. Accommodation and meals for participants will be covered by the Center. All other expenses (including round-trip transportation) shall be borne by the participants themselves.
2. The Center will arrange shuttle services to/from the following locations: Kunming High-Speed Railway Station, Kunming Changshui International Airport, and downtown Kunming. Participants are kindly requested to log in to the project management system (<http://tianyuanpm.amss.ac.cn/>) in a timely manner to register their travel information.
3. As the Center is located at a considerable distance from the nearest hospital, participants are advised to bring an adequate supply of essential personal medications.
4. Conference Contact:

Yanjun Liu (Jiangxi Normal University), Phone Number: 15070924503

Fang Zhou (Taiyuan Normal University), Phone Number: 15110349175

Xingzhong Xu (Hainan University), Phone Number: 15207154168

Lizhong Wang (Peking University), Phone Number: 13699158729

October 5 th (Monday)		
08:10-08:30	Opening Ceremony & Group Photo	
Time	Speaker	Chair
08:30-09:10	Caiheng Li	Jiping Zhang
09:20-10:00	Jin-xin Zhou	
10:00-10:20	Discussion over coffee	
10:20-11:05	Jun-Ru Lai	Lizhong Wang
11:10-11:50		
12:00-14:00	Lunch Break	
14:00-15:00	Andrey Vasil'ev	Qinhai Zhang
15:10-16:00	Terry Gannon	
16:10-16:25	Discussion over coffee	
16:25-16:55	Jinwei Yang	Quanshui Wu
17:00-17:30	Honglian Zhang	
17:30-19:30	Dinner Break	

October 6 th (Tuesday)		
Time	Speaker	Chair
08:00-08:50	Terry Gannon	Fei Xu
09:00-10:00	Andrey Vasil’ev	
10:00-10:20	Discussion over coffee	
10:20-11:05	Jun-Ru Lai	Lijian An
11:10-11:50		
12:00-14:00	Lunch Break	
14:00-14:30	Liping Li	Guohua Qian
14:35-15:05	Shenglin Zhou	
15:10-15:40	Wei Jin	
15:40-16:00	Discussion over coffee	
16:00-16:30	Yanfeng Luo	Heguo Liu
16:35-17:05	Zhencai Shen	
17:10-17:50	Yuanyang Zhou	
17:50-19:30	Dinner Break	

October 7 th (Wednesday)		
Time	Speaker	Chair
08:00-08:30	Nina Yu	Dandan Yang
08:35-09:05	Jing Zhao	
09:10-09:40	Wenting Zhang	
10:00-10:20	Discussion over coffee	
10:20-11:05	Jun-Ru Lai	Baoshan Wang
11:10-11:50		
12:00-14:00	Lunch Break	
14:00-14:50	Terry Gannon	Xueqin Hu
15:00-16:00	Andrey Vasil’ev	
16:00-16:20	Discussion over coffee	
16:20-16:50	Bengong Lou	Jun Liao
17:00-17:30	Pujin Li	
17:30-18:00	Dongdong Hou	
18:00-19:30	Dinner Break	

October 8 th (Thursday)		
Time	Speaker	Chair
08:20-09:10	Andrey Vasil'ev	Yang Liu
09:20-10:00		
10:00-10:20	Discussion	
10:20-11:10	Terry Gannon	Pengcheng Li
11:20-11:50	Ilya Gorshkov	
12:00-14:00	Lunch Break	
14:00-14:30	Jiaqing Sun	Xingzhong Xu
14:40-15:10	Yu Zeng	
15:10-17:30	Open Discussion	
17:30-19:30	Dinner Break	

October 9 th (Friday)		
Time	Speaker	Chair
08:10-08:40	Yongzhi Luan	Yucong Du
08:50-09:20	Qinghong Guo	
09:30-10:00	Quanfu Yan	
10:00-10:20	Discussion over coffee	
10:20-11:10	Terry Gannon	Fang Zhou
11:10-11:50	Open Discussion	
12:00-14:00	Lunch Break	
14:00-17:30	Open Discussion	
17:30-19:30	Dinner Break	

会议日程一（Schedule I）

10月4日	
周日 Sunday	报到（Registration）
10月10日	
周六 Saturday	离会（Departure）

10月5日（周一 Monday）			
08:10-08:30	开幕式及合影 Opening Ceremony & Group Photo		
时间 Time	报告人 Speaker	题目 Title of talk	主持人 Chair
08:30-09:10	李才恒	Classifying finite permutation groups of rank 3	张继平
09:20-10:00	周进鑫	On the automorphism groups of prime-valent graphs underlying orientably-regular maps	
10:00-10:20	讨论（Discussion over coffee）		
10:20-11:05	赖俊儒	Mini-Course: Quantum Wreath Products and Related Conjectures, I	王立中
11:10-11:50			
12:00-14:00	午餐（Lunch Break）		
14:00-15:00	Andrey Vasil'ev	Mini-Course: Element orders and structure of a finite group, I	张勤海
15:10-16:00	Terry Gannon	Mini-Course: Finite groups in tensor categories, vertex operator algebras and conformal field theory, I	
16:10-16:25	讨论（Discussion over coffee）		
16:25-16:55	杨进伟	Kazhdan-Lusztig correspondence over $\text{osp}(1 2n)$	吴泉水
17:00-17:30	张红莲	Drinfeld super Yangian of the exceptional Lie superalgebra $D(2, I; \lambda)$	
17:30-19:30	晚餐（Dinner Break）		

会议日程二 (Schedule II)

10月6日（周二 Tuesday）			
时间 Time	报告人 Speaker	题目 Title of talk	主持人 Chair
08:00-08:50	Terry Gannon	Mini-Course: Finite groups in tensor categories, vertex operator algebras and conformal field theory, II	徐斐
09:00-10:00	Andrey Vasil’ev	Mini-Course: Element orders and structure of a finite group, II	
10:00-10:20	讨论（Discussion over coffee）		
10:20-11:05	賴俊儒	Mini-Course: Quantum Wreath Products and Related Conjectures, II	安立坚
11:10-11:50			
12:00-14:00	午餐（Lunch Break）		
14:00-14:30	李利平	Representations of some categories in finite geometry	钱国华
14:35-15:05	周胜林	On flag-transitive 2 -(v, k, λ) designs with $\lambda \leq 4$	
15:10-15:40	靳伟	On arc transitive bicirculants	
15:40-16:00	讨论（Discussion over coffee）		
16:00-16:30	罗彦锋	Laws for triangular matrices	刘合国
16:35-17:05	申振才	Strongly closed subgroups of saturated fusion systems and their classification	
17:10-17:50	周远扬	Morita equivalences and extensions of nilpotent blocks over arbitrary fields	
17:50-19:30	晚餐（Dinner Break）		

会议日程三 (Schedule III)

10月7日（周三 Wednesday）			
时间 Time	报告人 Speaker	题目 Title of talk	主持人 Chair
08:00-08:30	余妮娜	Permutation orbifolds and simple current extensions	杨丹丹
08:35-09:05	赵静	When can a monic polynomial be expressed as $(x-a)^n$?	
09:10-09:40	张文婷	Characterization of Cross varieties of J -trivial monoids	
10:00-10:20	讨论（Discussion over coffee）		
10:20-11:05	賴俊儒	Mini-Course: Quantum Wreath Products and Related Conjectures, III	王宝山
11:10-11:50			
12:00-14:00	午餐（Lunch Break）		
14:00-14:50	Terry Gannon	Mini-Course: Finite groups in tensor categories, vertex operator algebras and conformal field theory, III	胡学琴
15:00-16:00	Andrey Vasil'ev	Mini-Course: Element orders and structure of a finite group, III	
16:00-16:20	讨论（Discussion over coffee）		
16:20-16:50	娄本功	On locally-quasiprimitive arc transitive graphs of prime power order	廖军
17:00-17:30	李璞金	A note about quasikernels and kernels of irreducible characters	
17:30-18:00	侯东东	Highly symmetric polytopes of 2-power order	
18:00-19:30	晚餐（Dinner Break）		

会议日程四 (Schedule IV)

10月8日（周四 Thursday）			
时间 Time	报告人 Speaker	题目 Title of talk	主持人 Chair
08:20-09:10	Andrey Vasil'ev	Mini-Course: Element orders and structure of a finite group, IV	刘洋
09:20-10:00			
10:00-10:20	讨论（Discussion over coffee）		
10:20-11:10	Terry Gannon	Mini-Course: Finite groups in tensor categories, vertex operator algebras and conformal field theory, IV	李鹏程
11:20-11:50	Ilya Gorshkov	Characterization of Finite Groups by the Set of Conjugacy Class Sizes	
12:00-14:00	午餐（Lunch Break）		
14:00-14:30	孙嘉庆	Algebraic McKay correspondence	徐行忠
14:40-15:10	曾宇	Real Characters and Real 2-Blocks of Finite Groups	
15:10-17:30	自由讨论 Open Discussion		
17:30-19:30	晚餐（Dinner Break）		

会议日程五（Schedule V）

10月9日（周五 Friday）			
时间 Time	报告人 Speaker	题目 Title of talk	主持人 Chair
08:10-08:40	栾永志	Simply reducible groups of order less than 2000	杜予聪
08:50-09:20	郭青宏	Vertices and heights in p -solvable groups	
09:30-10:00	颜全福	Classifying groups in terms of the degrees of their nonmonomial characters	
10:00-10:20	讨论（Discussion over coffee）		
10:20-11:10	Terry Gannon	Mini-Course: Finite groups in tensor categories, vertex operator algebras and conformal field theory, V	周芳
11:10-11:50	自由讨论 Open Discussion		
12:00-14:00	午餐（Lunch Break）		
14:00-17:30	自由讨论 Open Discussion		
17:30-19:30	晚餐（Dinner Break）		

短课程摘要 (Mini-Course Abstracts)

Terry Gannon (University of Alberta)

Finite groups in tensor categories, vertex operator algebras and conformal field theory

Terry Gannon

University of Alberta

We will begin with a description of moonshine, where finite groups like the Monster and Mathieu group M_{24} make surprise appearances. Then we will move to tensor categories, in particular fusion categories, which can be regarded as an enhancement and generalization of finite groups. We will sketch what that story is all about. A braided (roughly, a commutative) version of this theory, called modular fusion categories, is especially rich. It leads us to vertex operator algebras. Conformal field theory (a shadow of string theory in physics) underlies much of this material. My lectures will focus more on the ideas and big picture than details and technicalities.

賴俊儒 (中央研究院)

Quantum Wreath Products and Related Conjectures

Jun-Ru Lai

Academia Sinica

Recall that a Hecke algebra is a deformation of the group algebra. A quantum wreath product, roughly speaking, is a deformation of the group algebra of the wreath product $G \wr S_n$ of a (possibly infinite) group G by a symmetric group S_n in the sense that the coefficients are in a (not necessarily commutative) tensor product of algebras. In other words, all algebras admitting a Bernstein-Lusztig presentation are quantum wreath products, including (1) variants of the affine Hecke algebras, (2) Vigneras' pro-p Iwahori Hecke algebras, as well as (3) a new "Hecke algebra" for the wreath products between symmetric groups, appearing in a Morita equivalence theorem due to Jun Hu.

I'll speak about several conjectures in seemingly unrelated directions using recent development of the theory of quantum wreath products. These conjectures are:

(A) Ginzburg-Guay-Opdam-Rouquier conjecture: on constructing Ext preserving highest weight covers of non-semisimple Hecke algebras of complex reflection

groups,

(B) Foulkes conjecture: probably the longest standing open problem for the symmetric groups,

(C) Bergeon-Lam-Li conjecture: towards a classification of combinatorial Hopf algebras,

(D) Gao-Gurevich-Karawiesicz conjecture: on measuring the non-uniqueness of Whittaker models,

(E) Maksimau-Minets conjecture: on the realization of imaginary strata of affine Khovanov-Lauda-Rouquier algebras in positive characteristic.

In the minicourse, we'll explain a subset of the following general theory of quantum wreath products: PBW theorem, Schur-Weyl duality, Symmetric (Frobenius) algebra structures, cellular algebra structures, Kashiwara-Miwa-Stern type actions, Dipper-James basis of the wreath Schur algebras, connection with variants of Yangians and quantum groups, wreath module construction of notable representations, Clifford-type theory. We'll also explain the spectral sequence technique used in solving the GGOR conjecture of type D.

ВАСИЛЬЕВ АНДРЕЙ ВИКТОРОВИЧ (Институт математики им. С. Л. Соболева)

Element orders and structure of a finite group

Andrey V. Vasil'ev

Sobolev Institute of Mathematics, Novosibirsk, Russia

Finite group theory may be viewed as the study of the interplay between the algebraic structure of a group and its arithmetic properties, that is, those expressed in terms of numerical parameters. The well-known theorems of Lagrange, Sylow, and Feit-Thompson provide numerous examples of this interplay.

In this mini-course, we will explore the relationship between the structure of a finite group and the set of its element orders. We will consider the general structure of groups having the same set of element orders as a given finite simple or almost simple group. We will also discuss how the sets of element orders of simple and almost simple groups can be described.

报告摘要 (Talk Abstracts)

Илья Горшков (Институт математики им. С.А. Соболева)

Characterization of Finite Groups by the Set of Conjugacy Class Sizes

Ilya Gorshkov

Novosibirsk State Technical University

The talk addresses the question of to what extent a finite group is determined by the set of sizes of its conjugacy classes. A finite group L is called *N-recognizable* in the class of groups with trivial center if the equality $N(G) = N(L)$ implies the isomorphism $G \simeq L$ (here $N(G)$ denotes the set of conjugacy class sizes of the group G).

An overview of known results on N-recognizability will be given, as well as new results in this direction.

郭青宏 (西南石油大学)

Vertices and heights in p -solvable groups

Qing-hong Guo

Southwest Petroleum University

We investigate a counting formula concerning the set of irreducible π -partial characters of G lying over a fixed character θ of N with specified vertices. We also study the height preserving bijection in p -solvable groups.

侯东东 (山西师范大学)

Highly symmetric polytopes of 2-power order

Dongdong Hou

Shanxi Normal University

In this talk, we will present research results on highly symmetric polytopes whose automorphism group is a finite 2-group.

靳伟 (湘潭大学)

On arc transitive bicirculants

Wei Jin

Xiangtan University

Finite arc-transitive bicirculants with valency 3, 4, or 5 have been classified in several previous papers. In 2022, Devillers, Giudici, and Jin gave a reductive characterization of finite arc-transitive bicirculants, and using this, in 2023 a classification of finite 2-arc-transitive bicirculants is obtained. In this talk, we give a complete classification of finite vertex-transitive and locally-primitive bicirculants.

李才恒 (南方科技大学)

Classifying finite permutation groups of rank 3

Caiheng Li

Southern University of Science and Technology

Abstract: The problem of classifying rank 3 permutation groups was initiated by Higman in 1960s. Depending on the classification of finite simple groups, primitive ones have been classified by a series of papers in 1980s. However, the progress for the problem in the imprimitive case has been very slow, due to the fact that such groups are "wild", as described by Cheryl Praeger.

Recently, our joint work with Yan Zhou Zhu and others has brought a solution to this problem within reach, as I will explain in the talk.

李利平 (湖南师范大学)

Representations of some categories in finite geometry

Li-Ping Li

Hunan Normal University

Let $\mathbb{F}_q$ be a finite field, k a commutative ring in which q is invertible, and $\mathcal{C}$ the category of finite dimensional vector spaces over $\mathbb{F}_q$ whose morphisms are linear (resp., semilinear, affine, semiaffine) maps. In this talk I will describe a Dold-Kan correspondence for $\mathcal{C}$, showing that it is Morita equivalent to a much simpler k -linear category. As an application, this equivalence provides a transparent description for uniformly continuous representations of the topological transformation monoid of the universal object associated to $\mathcal{C}$.

李璞金 (山西师范大学)

A note about quasikernels and kernels of irreducible characters

Pujin Li

Shanxi Normal University

Abstract Let G be a finite group, and χ be an irreducible complex character of G . In character theory of finite groups, the kernel $\text{Ker}(\chi)$ and the quasikernel $Z(\chi)$ are fundamental normal subgroups associated with χ , satisfying the inclusion relation $\text{Ker}(\chi) \leq Z(\chi)$. In this paper, we introduce the invariant $\text{zk}(G) = |\{\chi \in \text{Irr}(G) \mid Z(\chi) = \text{Ker}(\chi)\}|$, which counts the number of irreducible complex characters of a finite group G whose quasikernels coincide with their kernels.

We establish several structural results linking this new character-theoretic invariant to group-theoretic properties of G . We prove that a finite group G is nilpotent if and only if $\text{zk}(G) = 1$, yielding a new nilpotency criterion via irreducible characters. Relying on the classification of finite simple groups, we show that every finite group with $\text{zk}(G) \leq 4$ is solvable. For non-solvable finite groups, we characterize the case $\text{zk}(G) = 5$: if G is non-solvable and $\text{zk}(G) = 5$, then $G/F(G) \cong A_5$, where $F(G)$ denotes the Fitting subgroup of G . We further obtain a necessary and sufficient condition for the equality $\text{zk}(G) = |\text{Irr}(G)|$, and raise an open problem concerning finite groups satisfying this equality.

This work is a joint research collaboration with Professor Haipeng Qu.

娄本功 (云南大学)

On locally-quasiprimitive arc transitive graphs of prime power order

Bengong Lou

Yunnan University

A graph Γ is called G -locally-quasiprimitive if the stabilizer subgroup G_α induces a quasiprimitive permutation group on the neighbourhood $\Gamma(\alpha)$ for each $\alpha \in V\Gamma$, where $G \leq \text{Aut}\Gamma$. In this talk, we give a characterization of locally quasiprimitive arc transitive graphs of prime power order. Furthermore, we give some examples of locally quasiprimitive but not locally primitive arc transitive graphs.

罗彦锋 (兰州大学)

Laws for triangular matrices

Yan-Feng Luo

Lanzhou University

In this talk, we investigate identities satisfied by monoids of upper triangular matrices over fields and over additively idempotent semirings with 0 and 1, and exhibit several new instances in which these identities admit no finite axiomatization. This is a joint work with Xun Hu and Mikhail Volkov.

栾永志 (山东大学)

Simply reducible groups of order less than 2000

Yongzhi Luan

Shandong University

A finite group is simply reducible if every conjugacy class is invariant under inversion and all products of irreducible complex characters are multiplicity-free. We organize census data for even orders at most 2000, with 1024 treated separately.

申振才 (中国农业大学)

Strongly closed subgroups of saturated fusion systems and their classification

Zhencai Shen

China Agricultural University

In this talk, we introduce recent advances concerning strongly closed subgroups of saturated fusion systems and their classification, in joint work with Drs. Zhigang Li, Tianze Wu and Shengmin Zhang.

(本文介绍饱和融合系的强闭子群及其分类方面的研究进展，合作者：李志刚、吴天泽、张晟民三位博士。)

孙嘉庆 (中国科学院数学与系统科学研究院)

Algebraic McKay Correspondence

Jiaqing Sun

Academy of Mathematics and Systems Science,
Chinese Academy of Sciences

We study the representation theory of a finite group G over a field k (whose characteristic does not divide $|G|$), with a focus on the McKay quiver and its generalizations associated with a 2-dimensional kG -module T . Let $\{V_1, \dots, V_n\}$ be a complete set of representatives of isomorphism classes of simple (left) kG -modules. By decomposing $T \otimes_k V_i$ and $T^* \otimes_k V_i$ into direct sums of simple modules, we can define a valued quiver $M(T, T^*)$. When k is algebraically closed, Auslander and Reiten showed that the underlying graph of the separated quiver is a disjoint union of extended Dynkin diagrams $\tilde{A}_n, \tilde{D}_n, \tilde{E}_6, \tilde{E}_7, \tilde{E}_8$. We generalize this result to arbitrary fields k , proving that the underlying valued graph of the separated quiver remains a union of Euclidean diagrams. Based on this, we further classify the possible decompositions of $T \otimes_k V_i$ into 11 distinct cases. We also count the number of connected components of $M(T, T^*)$.

Classifying groups in terms of the degrees of their nonmonomial characters

Quanfu Yan

Peking University

We consider two questions from the book "Characters of finite groups" by Berkovich and Zhmud' concerning primitive characters of finite groups. For a finite group G , let $\text{cd}_{\text{nm}}(G)$ denote the set of degrees of its nonmonomial irreducible characters. We prove that if G is nonsolvable and $\text{cd}_{\text{nm}}(G)$ is a chain under divisibility, then

$$G/\text{sol}(G) \cong \text{PSL}_2(7).$$

The proof requires extendible primitive characters of nonabelian simple groups whose degrees are incomparable under divisibility.

For a positive integer k , let $X_k(G)$ be the set of irreducible characters of G which are not induced from an irreducible character of degree at most k of a subgroup. We prove that every nontrivial group with trivial solvable radical has two distinct faithful primitive irreducible characters. It follows that if $|X_k(G)| \leq 1$, then $G/\text{sol}(G)$ has a faithful primitive character of degree at most k and

$$|G : \text{sol}(G)| \leq J(k),$$

where $J(k)$ is the least Jordan constant for finite subgroups of $\text{GL}_k(\mathbb{C})$. In particular, the bound is $(k+1)!$ for $k \geq 71$. We also show that the quotient is almost simple for $k \leq 11$, prove that the original question for $k = 2$ has an affirmative answer, and determine the possible nonsolvable quotients for $k = 3$ and 4 .

杨进伟 (上海交通大学)

Kazhdan-Lusztig correspondence over $\mathfrak{osp}(1|2n)$

Jin-Wei Yang

Shanghai Jiao Tong University

We construct a rigid braided tensor category on the category of ordinary modules for the affine Lie superalgebra $\mathfrak{osp}(1|2n)$ at generic level, and establish the Kazhdan-Lusztig correspondence, that is, a braided equivalence between the category of affine $\mathfrak{osp}(1|2n)$ modules and the category of finite dimensional weight modules for the quantum supergroup $\mathfrak{osp}(1|2n)$. We also show the full subcategory consisting of even modules for the affine $\mathfrak{osp}(1|2n)$ superalgebra is braided equivalent to the full subcategory of non-spinorial modules for the affine $\mathfrak{so}(2n+1)$ algebra. As an application, we glue the $\mathfrak{osp}(1|2n)$ categories and $\mathfrak{so}(2n+1)$ categories and obtain a new family of simple vertex operator superalgebras, called the mixed kernel vertex operator superalgebras.

余锐娜 (厦门大学)

Permutation orbifolds and simple current extensions

Ni-Na Yu

Xiamen University

In this talk, I will discuss permutation orbifolds and simple current extensions of vertex operator algebras and superalgebras. We develop an induction theory for permutation-twisted modules associated with solvable automorphism groups arising as semidirect products of simple current automorphisms and cyclic permutations. We describe the irreducible twisted modules in terms of stabilizer subgroups and projective representations, and determine their multiplicities explicitly. This is joint work with Ching Hung Lam.

曾宇 (苏州工学院)

Real Characters and Real 2-Blocks of Finite Groups

Yu Zeng

Suzhou University of Technology

An ordinary irreducible character is said to be real if it coincides with its complex conjugate. Similarly, a 2-block is called real if its set of irreducible characters is invariant under complex conjugation. In this talk, we present our recent results concerning real characters and real 2-blocks of finite groups. This is joint work with Fuming Jiang.

张红莲 (上海大学)

Drinfeld super Yangian of the exceptional Lie superalgebra $D(2,1; \lambda)$

Hong-Lian Zhang

Shanghai University

In this talk, we establish the first rigorous framework for the Drinfeld super Yangian associated with an exceptional Lie superalgebra, which lacks a classical Lie algebraic counterpart. Specifically, we systematically investigate the Drinfeld presentation and structural properties of the super Yangian associated with the exceptional Lie superalgebra $D(2,1;\lambda)$. First, we introduce a Drinfeld presentation for the super Yangian associated with the exceptional Lie superalgebra $D(2,1;\lambda)$, explicitly constructing its current generators and defining relations. A key innovation is the construction of a PBW basis using degeneration techniques from the corresponding quantum loop superalgebra. Furthermore, we demonstrate that the super Yangian possesses a Hopf superalgebra structure, explicitly providing the coproduct, counit, and antipode. This talk is based on the joint work with Hongda Lin.

张文婷 (兰州大学)

Characterization of Cross varieties of $\mathcal{JS}$ -trivial monoids

Wen-Ting Zhang

Lanzhou University

A finitely based, finitely generated variety with finitely many subvarieties is a Cross variety. In this talk, it is shown that a variety of J -trivial monoids is Cross if and only if it excludes 14 specific almost Cross varieties. Consequently, these 14 varieties exhaust all almost Cross varieties of J -trivial monoids.

赵静 (海南大学)

When can a monic polynomial be expressed as $(x-a)^n$

Jing Zhao

Hainan University

The Casas-Alvero Conjecture was proposed as follows: Let P be a monic univariate polynomial of degree d over a field $\mathbb{K}$ of characteristic zero. Then $\gcd(P, P_i)$ is non-trivial for $i = 1, \dots, d-1$ if and only if $P = (x-a)^d$ for some $a \in \mathbb{K}$. Here, P_i is the i -th Hasse derivative of P , that means $P_i = \frac{1}{i!}P^{(i)}(x)$ where $P^{(i)}(x)$ is the i -th derivative of P . In this talk, we propose the following new conjecture: Let $f(x)$ be a monic polynomial of degree n over a field F of characteristic zero, and let i and j be distinct positive integers with $i+j \leq n$. Then both $f^{(i)}(x)$ and $f^{(j)}(x)$ divide $f(x)$ if and only if $f(x) = (x-a)^n$ for some $a \in F$. We reduce the divisibility condition $f''(x) \mid f(x)$ to the Gegenbauer differential equation, and then, by employing the relevant properties of Gegenbauer and Legendre polynomials, we prove the conjecture in the case $i=2$.

周进鑫 (北京交通大学)

On the automorphism groups of prime-valent graphs underlying orientably-regular maps

Jin-Xin Zhou

Beijing Jiao Tong University

In this talk, I will introduce our recent work on the overgroups of a non-abelian simple automorphism group of an orientably regular map in the full automorphism group of its underlying prime-valent graph. It shows that apart from the normal case, the only exceptional pairs are:

(M_{24}, M_{23}) and (A_n, A_{n-1}) .

The sporadic case is unique up to isomorphism. For the alternating case, we characterize the possible vertex stabilizers in A_n and construct an explicit infinite family of new examples. Our construction answers a problem posed by Liebeck and Praeger in (Advances in Mathematics 462 (2025) 110086.)

周远扬 (华中师范大学)

Morita equivalences and extensions of nilpotent blocks over arbitrary fields

Yuan-Yang Zhou

Central China Normal University

In this paper, we investigate the structure of extensions of nilpotent blocks over arbitrary fields of characteristic p under the assumption that p is odd or a defect group of extensions of nilpotent blocks is abelian.

We show the existence of a suitable Morita equivalence between the extension of a nilpotent block and the extension of its Brauer correspondent. This is a generalization of the main result of Külshammer and Puig on extensions of nilpotent blocks over algebraically closed fields in terms of Morita equivalences.

On flag-transitive 2-(v, k, λ) designs with $\lambda \leq 4$

Sheng-Lin Zhou

South China University of Technology

Let D be a non-trivial 2-(v, k, λ) design with $\lambda \leq 4$, admitting a flag-transitive automorphism group G which is also properly innately transitive on points. Then G is of almost simple quotient type (ASQ). As a corollary, we obtain that G is innately transitive on points if and only if it is primitive when $\lambda \leq 3$. We also proved that there exists a unique 2-(v, k, λ) design for $\lambda = 4$ with an automorphism group G acting transitively on flags and properly innately transitively on points, i.e., the unique symmetric 2-(15, 8, 4) design with $G \cong \Gamma L_2(4)$ and its plinth $K \cong A_5$ as in [2, Proposition 1.5]. This is a joint work with Dr. Yihui Li.

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