The International Conference on Lie Theory and Representations 2019

Program



Department of Mathematics Shanghai University June 22nd-25th, 2019

The International Conference on Lie Theory and Representations 2019

Introduction

The International Conference on Lie Theory and Representations aims to provide an academic exchange platform for researchers in the field of Lie theory and representations to understand the latest research progress on this field and enhance mutual understanding and collaborations. The purpose of this conference is to promote a deep and systematic understanding of the reported research issues, and to further develop collaborations and communicate with each other.

Date

June 22nd-25th, 2019 (June 22nd, 2019: Registration, June 23rd-25th, 2019: Conference)

Venue

June 22nd, 2019: 13:00-18:00 The Lobby of New Lehu building #1

June 22nd, 2019: 18:00 Dinner at the 3rd Floor of Yixin Building

June 22nd -25th, 2019: Siyuan Hall New Lehu building #2

Organization committee

Nan Gao, Yun Gao, Xiuyun Guo, Naihuan Jing, Xuefeng Mao, Jiancai Sun, Qingwen Wang, Honglian Zhang, Jiao Zhang

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Schedule June 23rd, 2019

Time	Talk	Chair	
8:10-8:30	Opening/Photo		
8:30-9:10	Li Guo (Rutgers University-Newark): Braiding of some Hopf algebras in combinatorics	Naihuan	
9:10-9:50	Haisheng Li (Rutgers University-Camden): <i>Deforming vertex algebras by vertex bialgebras</i>	Jing	
9:50-10:10	Tea break		
10:10-10:50	Yucai Su (Tongji University): Mixed Cohomology of Lie Superalgebras		
10:50-11:30	Chengming Bai (Nankai University): Deformations and their controlling cohomologies of O-operators	Li Guo	
11:30-12:10	Hiroyuki Yamane (University of Toyama): Skew centers and generalized quantum groups with Kharchenko PBW theorem		
12:10-14:00	Lunch/Rest (Lehu Building 乐乎楼)		
14:00-14:40	Jun Hu (Beijing Institute of Technology): Crystal of affine \$\widehat{sl}_{\ell} and Hecke algebras at a primitive \$2\ell\$th root of unity	Haisheng	
14:40-15:20	Mei Si (Shanghai Jiao Tong University) : <i>Discriminants of quantized walled Brauer algebras</i>		
15:20-15:40	Tea break		
15:40-16:20	Rongchuan Xiong (East China Normal University): On new results and advances of the classification of finite-dimensional Hopf algebras	Naihong	
16:20-17:00	Yanan Cai (Soochow University) : Module structures on $U(S^{-})$ for the Schrodinger algebra		
17:00-17:40	Hao Chang (Central China Normal University): On the first Hochschild cohomology of cocommutative Hopf algebras of finite representation type		
17:40-	Dinner (3'" Floor Yixin Building 益新楼三楼)		

June 24th, 2019

Time	Talk	Chair	
8:30-9:10	Qiang Fu (Tongji University): Presenting affine schur algebras		
9:10-9:50	Li Luo (East China Normal University): Schur algebras and quantum symmetric pairs with unequal parameters	Jun Hu	
9:50-10:10	Tea break		
10:10-10:50	Dong Liu (Huzhou University): Representations on the	Chongming	
10:50-11:30	Yufeng Pei (Shanghai Normal University): Classification of finite-dimensional simple Balinsky-Novikov superalgebras	Bai	
11:30-14:00	Lunch/Rest (Lehu Building 乐乎楼)		
14:00-14:40	Xiangqian Guo (Zhengzhou University) : A class of \$\sl_{d+1}\$-modules from Witt algebra modules	Hongjia	
14:40-15:20	Yufeng Yao (Shanghai Maritime University): Non-weight modules over (super)algebras related to the Virasoro algebra	Chen	
15:20-15:40	Tea break		
15:40-16:20	Guangai Song (Shandong Technology and Business University): Dual Lie bialgebra structures of the twisted Heisenberg-Virasoro type	Yucai Su	
16:20-17:00	Xiaoqing Yue(Tongji University): <i>Modules of the intermediate series</i> <i>over not-finitely graded Lie algebras \$W(\Gamma)\$</i>		
17:00-17:40	Jianzhi Han (Tongji University): Two classes of irreducible non-weight modules over the Virasoro algebra		
17:40-	Dinner(3 rd Floor Yixin Building 益新楼三楼)		

June 25th, 2019

Time	Talk	Chair
8:30-9:10	Fang Li (Zhejiang University): Compatible Poisson structure and piecewise	
	standard Poisson structure on quantum cluster algebras	Limeng
9:10-9:50	Bin Shu (East China Normal University): Character formulas of tilting modules	Xia
	for infinite dimensional Cartan type Lie algebras	
9:50-10:10	Tea break	
10:10-10:50	Jinkui Wan (Beijing Institute of Technology): Stability of the centers of integral	
	group algebras of classical groups over finite fields	
10:50-11:30	Yongjie Wang (Hefei University of Technology): Howe duality for quantum	Fang Li
	queer superalgebra	
11:30-	End/Lunch (Lehu Building 乐乎楼)	

Title and Abstract

Deformations and their controlling cohomologies of \$\mathcal

O\$-operators

Chengming Bai (Nankai University)

Abstract: We establish a deformation theory of a kind of linear operators, namely, \$\mathcal O\$-operators in consistence with the general principles of deformation theories. On one hand, there is a suitable differential graded Lie algebra whose Maurer-Cartan elements characterize \$\mathcal O\$-operators and their deformations. On the other hand, there is an analogue of the Andr\'e-Quillen cohomology which controls the deformations of \$\mathcal O\$-operators. Infinitesimal deformations of \$\mathcal O\$-operators are studied and applications are given to deformations of skew-symmetric \$r\$-matrices for the classical Yang-Baxter equation. This is a joint work with Li Guo, Yunhe Sheng and Rong Tang.

Module structures on \$\U(S^-)\$ for the Schr\"{o}dinger algebra

Yanan Cai (Soochow University)

Abstract: In this talk, we classify modules which are free of rank 1 over the negative part for the Schr\"{o}dinger algebra $S=\sl_2\times\mH$. Sufficient and necessary conditions for such modules to be simple are given. From these modules, we construct examples of simple \$S\$-modules which are free of arbitrary rank over the Cartan subalgebra. This is a joint work with Yan He and Rencai Lv.

On the first Hochschild cohomology of cocommutative Hopf algebras of

finite representation type

Hao Chang (Central China Normal University)

Abstract: We will determine the restricted Lie structure of the first Hochschild cohomology $H^{1}(A,A)$ for some cocommutative Hopf algebra A, which is related to the infinitesimal group scheme of finite representation type.

Presenting affine schur algebras

Qiang Fu (Tongji University)

Abstract: Beilinson, Lusztig, and MacPherson (BLM) gave a geometric realization for the quantum enveloping algebra $\{ bf U \} (frak \{gl\}_n)$ of $frak \{gl\}_n$. Using BLM's work, a presentation of q-Schur algebras was derived by Doty--Giaquinto and Du--Parshall. We will use BLM realization of the universal enveloping algebra $\{ mathcal U \} (widehat \{gl\}_n)$ of $widehat \{gl\}_n$ to study the structure of affine Schur algebras. In particular, we give a presentation of the affine Schur algebra $\{ mathcal S \}_{\{vratriangle}(n,r)_{vrathbb Q}$.

Braiding of some Hopf algebras in combinatorics

Li Guo (Rutgers University-Newark)

Abstract: Several combinatorially constructed Hopf algebras, together with their relations, have played an important role in mathematics and theoretical physics. Such Hopf algebras include the Connes-Kreimer Hopf algebra of rooted trees, its noncommutative variation due to Foissy and Holtkamp, and the Loday-Ronco Hopf algebra of binary planar trees, and of planar trees. Braiding and quantization of the Foissy-Holtkamp Hopf algebras from the viewpoint of braiding dendriform and tridendriform algebras, and extend the isomorphism between the Foissy-Holtkamp Hopf algebra and Loday-Ronco Hopf algebra to the braided context. This is a joint work with Yunnan Li

A class of λ_{d+1} -modules from Witt algebra modules

Xiangqian Guo (Zhengzhou University)

Abstract: Let \$d\ge1\$ be an integer, \$W_d\$ be the Witt algebra. For any admissible \$W_d\$-module \$P\$ and any \$\gl_d\$-module \$V\$, one can form a \$\W_d\$-module \$F(P,V)\$, which as a vector space is $P \to V$. Since W_d has a natural subalgebra isomorphic to $|s|_{d+1}$, we can view F(P,V) as an $\frac{d+1}{-1}$, module. Taking $P=O(\frac{bf}{\lambda})$, the rank- $1\ U(\m{h})\$ -free W_d -module and $V=V(\b{a},b)$, the irreducible cuspidal l_{d+1} -module module over d, d\$, get the special $F(bf{\lambda});$ we $bf{a},b)=F(Omega(bf{lambda}), V(bf{a},b))$. We determine the necessary and sufficient conditions for the $||_{d+1}$ -module F(bf||a|,b) to be irreducible. And for the reducible case, we constructed their proper submodules explicitly.

Two classes of irreducible non-weight modules over the Virasoro algebra

Jianzhi Han (Tongji University)

Abstract: In this talk, we consider two classes of non-weight modules over the Virasoro algebra. And we will determine the irreducibility of these modules, give the isomorphism classes of these irreducible modules and finally we will show that these irreducible modules are "new". This is a joint work with H. Chen and Y. Su.

Crystal of affine \$\widehat{\mathfrak{sl}}_{\ell}\$ and Hecke algebras at a primitive \$2\ell\$th root of unity

Jun Hu (Beijing Institute of Technology)

Abstract: In this talk I will introduce a new realization of the crystal of affine $\$ widehat{\mathfrak{sl}}_{\ell} using the modular representation theory of the affine Hecke algebras H_n of type A and their level two cyclotomic quotients with Hecke parameter being a primitive $2\$ being the root of unity. We categorify the Kashiwara operators for the crystal as the functors of taking socle of certain two-steps restriction and of taking head of certain two-steps induction. The main results generalize the earlier work of Grojnowski and Vazirani on the crystal of affine $\$ affine $\$ and the affine Hecke algebras of type A at a primitive $\$ and the affine Hecke algebras of type A at a primitive $\$ and the affine Hecke algebras of type A at a primitive $\$ and the affine Hecke algebras of type A at a primitive $\$ and the affine Hecke algebras of type A at a primitive $\$ and the talk is based on a joint work with Lin Huang.

Compatible Poisson structure and piecewise standard Poisson structure on

quantum cluster algebras

Fang Li (Zhejiang University)

Abstract: Compatible Poisson structure is important for (quantum) cluster algebras. In this talk, we give the characterization of compatible Poisson structure on quantum cluster algebras via the so-called piecewise standard Poisson structure. At the same time, a relationship between inner Poisson structure and compatible Poisson structure is obtained for quantum cluster algebras.

Deforming vertex algebras by vertex bialgebras

Haisheng Li (Rutgers University-Camden)

Abstract: Previously, we introduced a notion of vertex bialgebra and a notion of module vertex algebra for a vertex bialgebra, and gave a smash product construction of nonlocal vertex algebras. Here, we introduce a notion of right comodule vertex algebra for a vertex bialgebra. Then we give a general construction of quantum vertex algebras from vertex algebras with a right comodule vertex algebra structure and a compatible (left) module vertex algebra structure for a vertex bialgebra \$H\$. As an application, we obtain a family of deformations of the lattice vertex algebras. This is based on a joint work with Naihuan Jing, Fei Kong and Shaobin Tan

Representations on the superconformal algebras.

Dong Liu (Huzhou University)

Abstract: Superconformal algebras are important algebraic objects realized in supersymmetric conformal field theories. These algebras can be regarded as a supersymmetric generalization of the Virasoro algebra. In this talk, we introduce some progresses on representations of the \$N=1, 2\$ superconformal algebras, including Harish-Chandra modules and Whittaker modules. It is based on some joint researches with Profs.Pei Yufeng and Xia Limeng.

Schur algebras and quantum symmetric pairs with unequal parameters

Li Luo (East China Normal University)

Abstract:We study the (quantum) Schur algebras of type B/C corresponding to the Hecke algebras with unequal parameters. We prove that the Schur algebras afford a stabilization construction in the sense of Beilinson- Lusztig-MacPherson that constructs a multiparameter upgrade of the quantum symmetric pair coideal subalgebras of type AIII/AIV with no black nodes. We further obtain the canonical basis of the Schur/coideal subalgebras, at the specialization associated to any weight function. These bases are the counterparts of Lusztig's bar-invariant basis for Hecke algebras with unequal parameters. This is joint work with Chun-Ju Lai.

Classification of finite-dimensional simple Balinsky-Novikov superalgebras

Yufeng Pei (Shanghai Normal University)

Abstract: In this talk, we classify finite-dimensional simple Balinsky-Novikov superalgebras over an algebraically closed field of characteristic p > 2. As a corollary, we obtain a family of simple modular Lie superalgebras. This is a joint work with Dong Liu and Limeng Xia

Character formulas of tilting modules for infinite dimensional Cartan type

Lie algebras

Bin Shu (East China Normal University)

Abstract: In this talk, we introduce tilting modules for infinite dimensional Cartan type Lie algebras of type W, S and H over complex numbers. We will finally present character formulas for them. This is a joint work with Feifei Duan and Yufeng Yao.

Discriminants of quantized walled Brauer algebras

Mei Si (Shanghai Jiao Tong University)

Abstract: We compute Gram determinants associated to all cell modules of quantized walled Brauer algebras $B_{r,t}(\rho,q)$ over an arbitrary field. Suppose e is the quantum characteristic of q^2, we classify the blocks of $B_{r,t}(\rho,q)$ when $e > \max\{r,t\}$ and $\rho ^2 = q^{2n}$, $n \in \mathbb{Z}$. As a consequence, we give a criterion for a cell module of $B_{r,t}(\rho,q)$ being equal to its simple head over an arbitrary field. This is a joint work with Linliang Song.

Dual Lie bialgebra structures of the twisted Heisenberg-Virasoro type

Guang'ai Song (Shandong Technology and Business University)

Abstract: In this paper, by studying the maximal good subspaces, we determine the dual Lie coalgebras of the centerless twisted Heisenberg-Virasoro algebra. Based on this, we construct the dual Lie bialgebras structures of the twisted Heisenberg-Virasoro type. As by-products, four new infinite dimensional Lie algebras are obtained.

Mixed Cohomology of Lie Superalgebras

Yucai Su (Tongji University)

Abstract: Supermanifolds are known to admit both differential forms and integral forms, thus any appropriate super analogue of the de Rham theory should take both types of forms into account. However, the cohomology of Lie superalgebras studied so far in the literature involves only differential forms when interpreted as a de Rham theory for Lie supergroups. Thus a new cohomology theory of Lie superalgebras is needed to fully incorporate differential-integral forms, and we investigate such a theory here. This new cohomology is defined by a BRST complex of Lie superalgebra modules, and includes the standard Lie superalgebra cohomology as a special case. General properties expected of a cohomology theory are established for the new cohomology, and examples of the new cohomology groups are computed. This is a joint work with R.B. Zhang.

Stability of the centers of integral group algebras of classical groups over finite fields

Jinkui Wan (Beijing Institute of Technology)

Abstract: The center of the integral group algebra of the general linear group GL(n,q) over a finite field admits a filtration with respect to the reflection length. We show that the structure constants of the associated graded algebras are independent of n and this stability leads to a universal stable center with positive integer structure constants. Various structure constants of the stable center are computed. Furthermore, as applications we extend the stability property to the centers of the integral group algebras of other classical finite groups including affine groups P(n,q), symplectic groups Sp(2n,q) and unitary groups U(n,q²) with respect to the filtrations defined via reflections belonging to these groups, respectively. This is partially based on joint work with Weiqiang Wang.

Howe duality for quantum queer superalgebra

Yongjie Wang (Hefei University of Technology)

Abstract: In this talk, We establish a new Howe duality between a pair of quantum queer superalgebras. We also show that the $(U_q^{-1} (q_n), U_q(q_m))$ -Howe duality implies the Sergeev-Olshanski duality. If time allows, I will talk something about the first fundamental theorem (FFT) for quantum queer superalgebras. This is my joint work with Z. Chang.

On new results and advances of the classification of finite-dimensional Hopf algebras

Rongchuan Xiong (East China Normal University)

Abstract: In this talk, we will discuss some new results and advances on the classification of finite-dimensional Hopf algebras.

Skew centers and generalized quantum groups with Kharchenko PBW theorem

Hiroyuki Yamane (University of Toyama)

Abstract: Coxeter introduced Coxeter groups in 1934, and he classified the finite Coxeter groups in 1935. Those are classified into ${\rm A}_n$, ${\rm D}}_n\$ ${\rm F}_{4}, {\rm E}_{6},$ ${\rm E}_{2}, {\rm E}_{2}$ ${\rm E}$ ${\rm G} \geq 2$, ${\rm I} n\$ ${\rm H} = 3$ and ${\rm H}_{4}.$ Coxeter groups appear in many areas of Algebra and Geometry. One of the areas is the representation theory of Lie algebras. Perhaps from 1970's, many researchers have considered that they needed 'Coxeter groupoids' being applied for study of the representation theory of Lie superalgebras. In 2000's, 'Coxeter groupoids' also became necessary for study of Hopf algebras called `Generalized quantum groups (GQGs)'. A GQG can be a quantum group, a multi-parameter quantum group, a quantum group at a root of unity, a quantum superalgebra, or the quantum double of a Nichols algebra of diagonal-type. In this talk, we mainly explain Skew centers of generalzed quantum groups, Kharchenko PBW theorem and some important equations in the positive part of the $A^{(1)}_1$ type affine quantum group.

Non-weight modules over (super)algebras related to the Virasoro algebra

Yufeng Yao (Shanghai Maritime University)

Abstract: We construct a class of non-weight modules over several kinds of (super)algebras related to the Virasoro algebra, i.e., the loop-Virasoro algebras, a class of Block type Lie algebras, and super-Virasoro algebras. We classify those modules whose restriction to the Cartan subalgebra (modulo center) are free of rank one or two. We also provide a sufficient and necessary condition for such modules to be simple, and determine their isomorphism classes. This is a joint work with Qiufan Chen, Limeng Xia and Hengyun Yang.

Modules of the intermediate series over not-finitely graded Lie algebras

\$W(\Gamma)\$

Xiaoqing Yue (Tongji University)

Abstract: Let W(Gamma) be a class of not-finitely graded Lie algebras related to generalized Virasoro algebras with basis $L_{\alpha}, L_{\alpha}, C_{\beta}, A_{\alpha}, A_{\beta}, C_{\beta}, A_{\alpha}, A_{\beta}, A_{\alpha}, A_{\alpha}, A_{\beta}, A_{\alpha}, A_$

No.	Name	Affililiation
1	Chengming Bai	NanKai University
2	Yanan Cai	Soochow University
3	Hao Chang	Central China Normal University
4	Jingmei Chang	Shanghai University
5	Haibo Chen	Shanghai Lixin University of Accounting and Finance
6	Hongjia Chen	University of Science and Technology of China
7	Qi Chen	East China Normal University
8	Lili Chi	Shanghai University
9	Ge Feng	East China Normal University
10	Qiang Fu	Tongji University
11	Nan Gao	Shanghai University
12	Yun Gao	Shanghai University
13	Li Guo	Rutgers University
14	Xiangqian Guo	ZhengzhouUniversity
15	Xiuyun Guo	Shanghai University
16	Jianzhi Han	Tongji University
17	Haian He	Shanghai University
18	Jun Hu	Beijing Institute of Technology
19	Naihong Hu	East China Normal University
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21	Huan Jia	East China Normal University
22	Qifen Jiang	Shanghai Jiao Tong University
23	Wei Jiang	Changshu Institute of Technology
24	Naihuan Jing	Shanghai University
25	Fang Li	Zhejiang University
26	Haisheng Li	Rutgers University-Camden
27	Dong Liu	Huzhou University
28	Gengqiang Liu	Henan University
29	Xuanyu Liu	Shanghai University
30	Lingji Lou	Shanghai University
31	Li Luo	East China Normal University
32	Jing Ma	Shanghai University
33	Xinru Ma	Shanghai University
34	Xuefeng Mao	Shanghai University
35	Zhenyuan Ni	Shanghai University
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37	Ran Shen	Donghua University
38	Wancheng Sheng	Shanghai University
39	Mei Si	Shanghai Jiao Tong University
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41	Guangai Song	Shandong Technology and Business University
42	Yucai Su	Tongji University
43	Jiancai Sun	Shanghai University
44	Lijun Tian	Shanghai University
45	Jinkui Wan	Beijing Institute of Technology
46	Danxia Wang	Shanghai University
47	Hengtai Wang	Nanhua University
48	Qianbao Wang	Shanghai University
49	Yongjie Wang	Hefei University of Technology
50	Yumei Wang	Shanghai University
51	Yuezhu Wu	Changshu Institute of Technology
52	Chunguang Xia	China University of Mining and Technology
53	Limeng Xia	Jiangsu University
54	Rongchuan Xiong	East China Normal University
55	Hanhan Xu	Shanghai University
56	Ying Xu	Hefei University of Technology
57	Zhucheng Xu	Shanghai University
58	Hengyun Yang	Shanghai Maritime University
59	Hiroyuki Yamane	Uniersity of Toyama
60	Yufeng Yao	Shanghai Maritime University
61	Cenlei Ying	Shanghai University
62	Yi Yu	Shanghai University
63	Xiaoqing Yue	Tongji University
64	Honglian Zhang	Shanghai University
65	Jiao Zhang	Shanghai University
66	Meirong Zhang	East China Normal University
67	Juanjuan Zhang	Qingdao University
68	Xiufu Zhang	Jiangsu Normal University
69	Wenhui Zhao	Shanghai University
70	Yiwei Zheng	Shanghai University
71	Ying Zheng	East China Normal University
72	Guohui Zhou	Shanghai University
73	Peicheng Zhu	Shanghai University

交通信息:

从浦东机场出发

方案一:乘坐出租车,经中环到原平路下高速,然后到上海大学北门(锦秋路),时间 60 分钟 左右,费用220元左右。

方案二: 可搭乘磁悬浮至龙阳路, 换乘地铁7号线乘至上海大学站二号出口, 时间大约1小时 40 分钟,费用 55 元。

方案三: 地铁2号线东延线至广兰路, 站内换乘2号线至静安寺站, 换乘地铁7号线乘至上海 大学站二号出口,时间大约1小时40分钟,费用8元。

从虹桥火车站或者虹桥机场出发

方案一:乘坐出租车经外环线到上海大学北门(锦秋路),时间 40 分钟左右,费用 60 元左右。

方案二: 地铁2号线至静安寺站, 换乘地铁7号线乘至上海大学站二号出口, 时间大约1小时, 费用6元。



上海大学宝山校区地图