Workshop on Algebra

Capital Normal University, Beijing, September 16, 2017

Second Teaching Building, 613

Timetable

8:50-9:00	Welcome speech	
Time	**Speaker**	**Title**
9:00-9:50	Steffen Koenig	On monoid algebras
10:00-10:50	Yuanyang Zhou	Blocks with defect group $\mathbb{Z}_{2^n} \times \mathbb{Z}_{2^n} \times \mathbb{Z}_{2^m}$
11:00-11:50	Xiangqian Guo	$U(h)$-free modules over Lie algebras
Lunch break		
14:30-15:20	Jinkui Wan	Frobenius map for the centers of Hecke algebras
15:30-16:20	Huanhuan Li	Graded Steinberg algebras and their representations
16:30-17:20	Zhengfang Wang	Homotopy algebra structures over the Tate Hochschild complex of a finite group
Dinner		

Abstract

$U(h)$-free modules over Lie algebras

Xiangqian Guo

Zhengzhou University, China

In this talk, I will give a brief introduction of the $U(h)$-free module theory over Lie algebras. Some recent results for various Lie algebras, including finite-dimensional Lie algebras, Kac-Moody algebras, Virasoro algebra, Witt algebras and other related Lie algebras, on this topic will be presented.

On monoid algebras

Steffen Koenig

University of Stuttgart, Germany

A finite monoid M is a finite set with an associative multiplication and a unit element. The monoid algebras kM, where k is a commutative ring, are shown to have an interesting chain of two-sided ideals. When M is a regular monoid and k a field, this chain is a stratifying chain, which can be used to (re)prove various results on the structure of the monoid algebras. This is joint work in progress with Anne Henke.

Graded Steinberg algebras and their representations

Huanhuan Li

Western Sydney University, Australia

We study the category of left unital graded modules over the Steinberg algebra of a graded ample Hausdorff groupoid. We show that this category is isomorphic to the category of unital left modules over the Steinberg algebra of the skew-product groupoid arising from the grading. To do this, we show that the Steinberg algebra of the skew product is graded isomorphic to a natural generalisation of the Cohen-Montgomery smash product of the Steinberg algebra of the underlying groupoid with the grading group. This is a joint work with Pere Ara, Roozbeh Hazrat and Aidan Sims.

Frobenius map for the centers of Hecke algebras

Jinkui Wan

Beijing Institute of Technology, China

We introduce a commutative associative graded algebra structure on the direct sum Z of the centers of the Hecke algebras associated to the symmetric groups in n letters for all n. As a natural deformation of the classical construction of Frobenius, we establish an algebra isomorphism from Z to the ring of symmetric functions. This isomorphism provides an identification between several distinguished bases for the centers (introduced by Geck-Rouquier, Jones, Lascoux) and explicit bases of symmetric functions. This is a joint work with Weiqiang Wang.

Homotopy algebra structures over the Tate Hochschild complex of a finite group

Zhengfang Wang

Peking University, China

In this talk, we start with recalling the notion of Tate Hochschild complex of a finite group. Roughly speaking, it is a mapping cone of a morphism (of complexes) from the Hochschild chain complex to cochain complex. We study the homotopy algebra (i.e., A-infinity, L-infinity) structures on the Tate Hochschild complex. There is a subcomplex (called Tate complex) which computes the classical Tate cohomology, in the Tate Hochschild complex. We will show that this subcomplex is A-infinity and L-infinity subalgebras. Conjecturally, the L-infinity subalgebra is abelian. This is a joint work (in progress) with Yuming Liu and Guodong Zhou.

Blocks with defect group $\mathbb{Z}_{2^n} \times \mathbb{Z}_{2^n} \times \mathbb{Z}_{2^m}$

Yuanyang Zhou

Central China Normal University, Wuhan, China

We prove that a block with defect group $\mathbb{Z}_{2^n} \times \mathbb{Z}_{2^n} \times \mathbb{Z}_{2^m}$, where $n \geq 2$ and m is arbitrary, is Morita equivalent to its Brauer correspondent. This is a joint work with Chao Wu and Kun Zhang.