

Workshop on Silting and Related Topics

December 7-9, 2018, USTC, Hefei

December 7 (Friday)

16:00-20:00	Arrival/Registration
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December 8 (Saturday)

Time	Talk
9:00-9:50	Yu Zhou
10:00-10:50	Zhe Han
10:50-11:10	Break
11:10-12:00	Jiaqun Wei
12:00-14:00	Lunch Break
14:00-14:50	Hongxing Chen
15:00-15:50	Zhenxing Di
15:50-16:10	Break
16:10-17:00	Yingying Zhang
17:10-18:00	Ming Lu

December 9 (Sunday)

Time	Talk
9:00-9:50	Haiyan Zhu
10:00-10:50	Peiyu Zhang
10:50-11:10	Break
11:10-12:00	Xiaojin Zhang
12:00-14:00	Lunch Break
14:00-17:00	Problem Session/Departure

Lecture Room: 1318, the math building, USTC (科大东区, 管理科研楼 1318 教室)

Arrival/Registration: 中铁凯莱酒店, 合肥包河区望江东路 96 号

Sponsors: School of Mathematical Sciences, USTC, and NSF

Organizers: Xiao-Wu Chen, Jue Le, Ren Wang, Yu Ye

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Abstracts

Hongxing Chen, Constructions of Recollements of Derived Module Categories from Big Tilting Complexes

Abstract: Given a good 1-tilting module T over an associative ring A , it was shown that the derived category of the endomorphism ring B of T is a recollement of the derived categories of the rings A and C , where C is the universal localization of B . Unfortunately, this result can't be extended to n -tilting modules for n bigger than one. However, since tilting modules can be regarded as a special kind of big tilting complexes, it seems reasonable to ask for a similar result by replacing 1-tilting modules with two-term big tilting complexes. This is a joint work with Changchang Xi and Huabo Xu.

Yingying Zhang, Reduction of Wide Subcategories and Recollements

Abstract: Abelian categories are a fundamental algebraic structures. As a special subcategory of an abelian category, wide subcategories provide a significant interface between representation theory and combinatorics. Actually, wide subcategories of an abelian category are analogous to thick subcategories of a triangulated category. Also wide subcategories are closely related to other important notions in representation theory, such as torsion theories, Serre classes, silting complexes, semistable subcategories and support-tilting modules. In this talk, we prove that if an abelian category $\mathcal{A}$ admits a recollement relative to abelian categories $\mathcal{A}'$ and $\mathcal{A}''$, there is a bijection between wide subcategories in $\mathcal{A}$ containing $i_*(\mathcal{A}')$ and wide subcategories in $\mathcal{A}''$. Moreover, the wide subcategory $\mathcal{C}$ of $\mathcal{A}$ containing $i_*(\mathcal{A}')$ admits a new recollement relative to wide subcategories $\mathcal{A}'$ and $j^*(\mathcal{C})$ which induced from the original recollement.

Ming Lu, Categorification of Quantum Symmetric Pairs via Quiver with Involutions

Abstract: Quantum symmetric pairs, as a quantization of real Lie algebras, is hot in Lie theory. A natural question is how to construct a kind of Hall algebras to categorify the quantum symmetric pairs, analogous to quantum groups.

In order to solve this problem, first, inspired by the work of Ringel, we construct a kind of 1-Gorenstein algebras from quivers with involutions. By considering modified Ringel-Hall algebras of this kind of 1-Gorenstein algebras, we give a realization of the quantum symmetric pairs of finite type. Using and generalising the

APR-tilting transformation of this kind of 1-Gorenstein algebras, we realise the braid group actions of the quantum symmetric pairs obtained by S. Kolb and J. Pellegrini.

Second, inspired by the works of Nakajima, Lusztig, Fan Qin, we consider the derived category of perverse sheaves over quiver with involutions, and prove that its graded Grothendieck group is isomorphic to quantum symmetric pairs.

This is an ongoing work joint with Weiqiang Wang.

Yu Zhou, An Introduction to Silting Theory

Abstract: In this talk, we give an overview of recent developments in silting theory. We focus on silting complexes in the perfect category of an algebra. We discuss links between silting complexes, t-structures, torsion pairs, support τ -tilting modules, and cluster tilting objects.

Jiaqun Wei, Some Results on Big Silting Complexes

Abstract: In this talk, we will present some basic results on big silting complexes and give detailed proof.

Zhenxing Di, On Triangle Equivalences of Stable Categories

Abstract: We apply the Auslander-Buchweitz approximation theory to show that the Iyama and Yoshino's subfactor triangulated category can be realized as a triangulated quotient. Applications of this realization go in three directions. Firstly, we recover both a result of Iyama and Yang and a result of the third author. Secondly, we extend the classical Buchweitz's triangle equivalence from Iwanaga-Gorenstein rings to Noetherian rings.

Finally, we obtain the converse of Buchweitz's triangle equivalence and a result of Beligiannis, and give characterizations for Iwanaga-Gorenstein rings and Gorenstein algebras. This is a joint work with Zhongkui Liu and Jiaqun Wei.

Zhe Han, An Introduction to HRS-tilting

Abstract: Happel-Reiten-Smalø tilting (HRS tilting) is a construction of a new abelian category from an abelian category with torsion pairs. This process plays an important role in representation theory of algebras. In this talk, we will introduce the definition and some basic properties of HRS-tilting. We also give some examples to show how it works.

Peiyu Zhang, Relative AR-correspondence, Co-t-structure and Silting Pair

Abstract: As a generalization of a tilting pair, which was introduced by Miyashita, the notion of a silting pair is introduced. We extend a characterization of tilting modules given by Bazzoni to silting pairs, and prove that there is a one-one correspondence between equivalent class of silting pairs and certain subcategories which satisfy some

conditions. Furthermore, we also give a bijection between silting pairs and bounded above co-t-structures.

Xiaojin Zhang, Three Results for τ -rigid Modules

Abstract: τ -rigid modules are very essential in the τ -tilting theory introduced by Adachi, Iyama and Reiten. In this talk, we give equivalent conditions for Iwanaga-Gorenstein algebras with self-injective dimension at most one in terms of τ -rigid modules. We show that every indecomposable module over iterated tilted algebras of Dynkin type is τ -rigid. Finally, we give a τ -tilting theorem on homological dimension which generalizes that of tilting modules. This is a joint work with Zongzhen Xie and Libo Zan.

Haiyan Zhu, An Introduction to Big Tilting Theory

Abstract: In this talk, we will introduce recent developments in ∞ -tilting theory which is based largely on the works of L. Positselski and J. Stovicek.