Mini-Workshop on Representation Theory of Algebras

January 1-2, 2021, USTC, Hefei

Jan. 1 (Friday)

Time	Talk
9:00-12:00	Arrival
12:00-14:30	Break
14:30-15:10	Houjun Zhang 张后俊
15:15-15:55	Jie Li 李杰
15:55-16:15	Tea Break+Group Photo
16:15-16:55	Ren Wang 汪任
17:00-17:40	Junyang Liu 刘钧旸

Jan. 2 (Saturday)

Time	Talk
9:00-9:40	Yu Wang 王钰
9:45-10:25	Jian Liu 刘剑
10:25-10:45	Tea Break
10:45-11:25	Haibo Jin 晋海波
11:30-14:30	Break
14:30-16:30	Free Discussion/Departure

Lecture Room: 管理科研楼 1318

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Abstracts

Haibo Jin, Reductions of triangulated categories and simple-minded collections

Abstract: Silting and Calabi-Yau reductions are important processes in representation theory to construct new triangulated categories from given ones, which are similar to Verdier quotient. In this talk, I will introduce a new reduction process of triangulated category, which is analogous to the silting (Calabi-Yau) reduction. For a triangulated category T with a pre-simple-minded collection (=pre-SMC) R, we construct a new triangulated category U such that the SMCs in U bijectively correspond to those in T containing R. I will give an analogue of Buchweitz's theorem for the singularity category of a SMC quadruple, and show that the SMS (simple-minded system) reduction due to Coelho Simoes and Pauksztello is the shadow of our SMC reduction.

Jie Li, Derived-discrete algebra over the real numbers

Abstract: We classify derived-discrete algebras over the real numbers up to Morita equivalence, using the classification of complex derived-discrete algebras in [D. Vossieck, The algebras with discrete derived category, J. Algebra 243 (2001), 168 – 176]. To this end, we investigate the quiver presentation of the complexified algebra of a real algebra given by a modulated quiver and an admissible ideal.

Jian Liu, Duality of thick subcategories in the bounded derived category over complete intersections via cohomological supports

Abstract: In this talk, we will study cohomological supports over complete intersections. With the method of exterior algebra, we show that cohomological supports detect the containment of thick subcategories of the bounded derived category over a complete intersection. As a corollary, thick subcategories of the bounded derived category over a complete intersection are stable under Grothendieck duality. This was proved by Greg Stevenson via classifying thick subcategories of the singularity category over a complete intersection. This is a joint work with Josh Pollitz.

Junyang Liu, Relative Calabi-Yau Completions, after W.K. Yeung

Abstract: This is a reading report on Yeung's work. We introduce the notion of relative Calabi-Yau structures on functors between homologically smooth differential graded categories. For any functor between homologically smooth and flat dg categories, together

with a class in the relative Hochschild homology, we construct the corresponding deformed relative Calabi-Yau completion. We show that, under some finiteness and relative negative cyclic homology lifting conditions, it has a canonical relative Calabi-Yau structure.

Ren Wang, Skew group categories, algebras associated to Cartan matrices, and folding of root lattices

Abstract: Let G be a finite group. To each finite G-category $\mathfrak{C}$, we associate a skew group category $\mathfrak{C} \rtimes G$. We focus on a finite free EI category $\mathfrak{C}$ (Q, U) associated to a finite EI quiver (Q, U) with a G-action. We construct a quotient EI quiver $(\bar{Q},\bar{U})$, and prove its associated free EI category $\mathfrak{C}$ $(\bar{Q},\bar{U})$ equivalent to the skew group category $\mathfrak{C}$ (Q,U) $\rtimes$ G. By using this result to an acyclic quiver Δ with an automorphism σ, we obtain a Morita equivalence between the corresponding skew group algebra $K\Delta\#G$ and an algebra H introduced in [C. Geiss, B. Leclerc, and J. Schröer, Quivers with relations for symmetrizable Cartan matrices I: Foundations, Invent. Math. 209 (2017), 61--158], which is associated to a symmetrizable Cartan matrix C. Moreover, we construct a functor from the category of $K\Delta$-modules to the category of τ-locally free H-modules, which categorifies the folding of root lattices of Δ and C. In particular, in Dynkin cases, the same functor categorifies the corresponding folding of positive roots.

Yu Wang, On singular Hochschild cohomology

Abstract: We interpret commutation of singular Hochschild cohomology by suspended version of Eckmann-Hilton argument. We consider the small order singular Hochschild cohomology and singular deformations.

Houjun Zhang, A differential graded approach to the silting theorem

Abstract: A silting theorem was established by Buan and Zhou as a generalization of the classical Brenner and Butler tilting theorem. Let P be a two-term silting complex in the bounded homotopy category K^{b}(proj A) of finitely generated projective modules of a finite dimensional algebra A and B=End_{D^{b}(mod A)}(P). Buan and Zhou constructed a two-term silting complex Q in K^{b}(proj B). They proved that the endomorphism algebra of Q is a factor algebra of A and obtained natural equivalences by Hom and Ext functors between the induced torsion pairs in mod A and mod B. In this talk, we will give a new interpretation of the theorem by using differential graded algebras. This is a joint work with Zongzhen Xie and Dong Yang.