Mini-Workshop on Algebras and Representation Theory

January 7-8, 2023, USTC, Hefei

Jan. 7 (Saturday)

Time	Chair	Talk
9:00-12:00		Arrival
12:00-14:30		Break
14:30-15:20	Bernhard Keller	Haigang Hu　胡海刚（中国科学技术大学）
15:25-16:15		Yunfeng Wang 汪云峰（中国科学技术大学）
16:15-16:40		Tea Break + Group Photo
16:40-17:30		Ren Wang　汪任（合肥工业大学）

Jan. 8 (Sunday)

Time	Chair	Talk
9:00-9:50	Yu Ye	Yilin Wu　吴燚林（中国科学技术大学）
9:55-10:45		Jie Li　李杰（合肥工业大学）
10:45-11:05		Tea Break
11:05-11:55		Bernhard Keller（巴黎大学）
12:00-14:00		Break
14:00-16:00	Yu Ye	Problem Session
16:05-17:00		Free Discussion

Lecture Room: 管理科研楼 1318

组织者：陈小伍，Bernhard Keller，乐珏，叶郁

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若网络允许，会议网络直播的腾讯会议室如下：
Jan. 7, 590-441-348 (password 2023), Jan. 8, 996-339-758 (password 2023)

Abstracts

Haigang Hu, Clifford quadratic complete intersections

Abstract: In this talk, we define and study Clifford quadratic complete intersections. After showing some properties of Clifford quantum polynomial algebras, we show that there is a natural one-to-one correspondence between Clifford quadratic complete intersections and commutative quadratic complete intersections. As an application, we give a classification of Clifford quadratic complete intersections in three variables in terms of their characteristic varieties. This is a joint work with Izuru Mori (Shizuoka University).

Bernhard Keller, On Jensen-King-Su's root conjecture

Abstract: In 2016 (Proc. LMS), Jensen-King-Su introduced an (infinite-dimensional, noncommutative) Gorenstein algebra whose category of Cohen-Macaulay modules categorifies the cluster algebra of the Grassmannian of k-dimensional subspaces in n-dimensional space. The cluster variables correspond to distinguished rigid indecomposable CM-modules which we call cluster modules. Let the diagram J(k,n) be a chain of length n-1 with a branch attached to the kth vertex. Jensen-King-Su conjectured that the extended dimension vector of each cluster module is a root of the Kac-Moody algebra associated with the diagram J(k,n). They checked their conjecture for the case where J(k,n) is a Dynkin diagram.

Further evidence for the conjecture has been given by by Baur-Bogdanic-Garcia Elsener-Li (Nagoya Math. J. 2020). We will show how to associate a representation of an orientation of J(k,n) with each CM-module. By Kac's theorem, the conjecture follows if this representation is indecomposable for each cluster module.

Jie Li, The real-gentle algebras

Abstract: We introduce the notion of real-gentle algebras. They are defined by modulated quivers over the real number field and become gentle algebras in the usual sense after complexification. This is a joint work with Chao Zhang in progress.

Yunfeng Wang, An introduction to the Bridgeland stability conditions

Abstract: In this talk, we will review some facts of Bridgeland stability conditions. As an example, we will give an exact description of the subspace of stability conditions on the triangulated category generated by length 4 exceptional collections.

Ren Wang, Singular equivalences and Auslander-Reiten conjecture

Abstract: Auslander-Reiten conjecture, which says that an Artin algebra does not have any non-projective generator with vanishing self-extensions in all positive degrees, is shown to be invariant under certain singular equivalences induced by adjoint pairs, which occur often in matrix algebras, recollements and change of rings. Accordingly, several reduction methods are established to study this conjecture. This is a joint work with Y. Chen, W. Hu and Y. Qin.

Yilin Wu, Relative cluster categories and Higgs categories with infinite-dimensional morphism spaces

Abstract: Cluster categories were introduced in 2006 by Buan–Marsh–Reineke–Reiten–Todorov in order to categorify acyclic cluster algebras without coefficients. Their construction was generalized by Amiot to Jacobi-finite quivers with potential (2009). Later, Plamondon generalized it to arbitrary cluster algebras associated with quivers (2009 and 2011). Cluster algebras with coefficients are important since they appear in nature as coordinate algebras of varieties like Grassmannians, double Bruhat cells, unipotent cells, ...The work of Geiss-Leclerc-Schröer often yields Frobenius exact categories which allow to categorify such cluster algebras. In previous work, we have constructed Higgs categories and relative cluster categories in the relative Jacobi-finite setting (arXiv:2109.03707). Higgs categories generalize the Frobenius categories used by Geiss-Leclerc-Schröer.

In this talk, we give the construction of the Higgs category and of the relative cluster category in the relative Jacobi-infinite setting under suitable hypotheses. As in the relative Jacobi-finite case, the Higgs category is no longer exact but still extriangulated in the sense of Nakaoka-Palu (2019). We also give the construction of a cluster character in this setting. This is a joint work with Bernhard Keller.