Workshop on Affine Deligne-Lusztig Varieties and Related Topics

SCMS, Fudan University

March 5-8, 2025

Workshop on Affine Deligne-Lusztig Varieties and Related Topics

Venue:

Room 102, Shanghai Center for Mathematical Sciences,
Jiangwan Campus, Fudan University

Scientific Committee:

Xuhua He, Sian Nie

Speakers:

- Zhe Chen,   Shantou University
- Jingren Chi,   Morningside Center of Mathematics, AMSS
- Felix Schremmer,   The University of Hong Kong
- Ryosuke Shimada,   The University of Hong Kong
- Chia-Fu Yu,   Academia Sinica
- Qingchao Yu,   Shenzhen University

Organizers:

Miaofen Chen, Rufei Ren, Haining Wang, Lingfei Yi

Schedule

Time	March 6	March 7
10:00-11:00	Chia-Fu Yu	Jingren Chi
11:00-11:30	Tea break & photo	Tea break
11:30-12:30	Ryosuke Shimada	Zhe Chen
14:30-15:30	Qingchao Yu	Free discussion
16:00-16:30	Tea break	Free discussion
16:30-17:30	Felix Schremmer	Free discussion
18:15	Banquet	

Titles & Abstracts

Speaker：Chia-Fu Yu (Academia Sinica)

Title：Components of the basic locus of certain Shimura varieties

Abstract：In this talk I shall describe how the components of J_b-orbits of an affine Deligne-Lusztig varieties contribute to the components of the basic locus of a Shimura variety. Then we shall present results for the cases of PEL-type A and C. This is based on joint works with Jiangwei Xue and Yasuhiro Terakado.

Speaker：Ryosuke Shimada (The University of Hong Kong)

Title：On the Chen-Zhu conjecture

Abstract：According to the Chen-Zhu conjecture, the set of the irreducible components of ADLV is parametrized by the crystal basis. In this talk, I will talk about the explicit construction of each irreducible component from the corresponding crystal element.

Speaker：Qingchao Yu (Shenzhen University)

Title：Affine Deligne-Lusztig Varieties of Geometric Coxeter Type

Abstract：In this talk, we shall discuss the new notion of geometric Coxeter type elements in the affine Weyl group. It turns out that for such an element w, $X_w(b)$ has very nice geometric properties for all $[b] \in B(G)$. It behaves very well under Deligne-Lusztig reduction and is a trivial fibration over a classical Deligne-Lusztig variety of Coxeter type. This talk is based on my joint work with Sian Nie and Felix Schremmer.

Workshop on ADLV and Related Topics

Speaker：Felix Schremmer (The University of Hong Kong)

Title：Affine Deligne-Lusztig varieties beyond the minute case

Abstract：Affine Deligne-Lusztig varieties in the fully Hodge-Newton decomposable (or minute) case are the only larger class of ADLVs which could be described completely in the past. Instances of them play important roles in arithmetic geometry, from Harris-Taylor's proof of the local Langlands correspondence to applications in the Kudla program. In this joint work with Eva Viehmann, we generalize many of the equivalent conditions characterizing them to obtain in this way a larger class of ADLVs that still have a similarly good and computable description of their geometry. To generalize the minute condition itself, we introduce the notion of depth for a Shimura datum - the minute cases being those of depth bounded by 1, the cases we study being the ones of depth less than 2.

Speaker：Jingren Chi (Morningside Center of Mathematics, AMSS)

Title：Geometry of affine Springer fibers and generalizations

Abstract：Affine Springer fibers are analogues of Springer fibers for the loop Lie algebras of reductive groups. They were first studied by Kazhdan and Lusztig and they have played important roles in various problems from geometric representation theory and automorphic representation theory.

In this talk I will review the basic geometric properties of affine Springer fibers and report on recent work on some of their generalizations, including the group version and the mixed characteristic analogue.

Speaker：Zhe Chen (Shantou University)

Title：On Deligne--Lusztig theory over cdvr: algebraisation, dimension, and sign

Abstract：In this talk we discuss an algebraisation of generic Deligne--Lusztig representations of connected reductive groups over a cdvr, proved in two joint works with Stasinski. This is an explicit character formula and provides an affirmative answer to a question raised by Lusztig. We will start with the special case of GL_n, illustrating the situation using orbits, and then explain how to pass from GL_n to arbitrary reductive groups. In the end, we present a conjectural sign formula, which is unconditional on all parameters.

Accommodation

Hotel
Fraser Place Wujiaochang Shanghai 上海五角场辉盛坊公寓酒店
1258 Yinhang Road, Yangpu District, Shanghai

Direction From Pudong airport (PVG)
Taxi: takes about 50 mins and costs around 180 RMB.
Subway: line 2 and line 10 to Xinjiangwancheng Station, and walk about 5 mins.

From Hongqiao Airport (SHA) / Hongqiao Railway Station
Taxi: takes about 50 mins and costs around 100 RMB.
Subway: line 10 to Xinjiangwancheng Station, and walk about 5 mins.

Dining information

Dining hall on Campus:
Please use your lunch coupons for lunch at the dinning hall on March 6th and March 7th.

Restaurants in UFUN Mall（悠方）:
Located near Gate 3 of Jiangwan Campus (15 mins walking from SCMS or 5 mins walking from the hotel).

Restaurants in Wujiaochang（五角场）Area:
There are many fancy restaurants in shopping malls in this area; it takes 15 mins from Campus to get there via the subway Line 10.

Map