



北京大学
PEKING UNIVERSITY

Handbook of
Lectures on arithmetic geometry

June. 16-20, 2025

School of Mathematical Sciences

Beijing International Center for Mathematical Research

Peking University, Beijing, China

Schedule

	6/16(Mon) ¹	6/17(Tue) ¹	6/18(Wed) ¹	6/19(Thu) ²	6/20(Fri) ²
8:30-9:00	Registration		Longke Tang ³		
9:00-9:30	Xinwen Zhu	Shizhang Li	Yuanyang Jiang ³ (9:45 -10:45)	Shizhang Li	Yiwen Ding
9:30-10:00					
10:00-10:30	Tea break			Tea break	
10:30-11:00	Longke Tang	Xinwen Zhu	Xiangqian Yang ³	Yiwen Ding	Yuanyang Jiang
11:00-11:30					
11:30-12:00					
12:00-14:00	Lunch break				
14:00-15:00	Yiwen Ding	Yiwen Ding	Free afternoon	Xinwen Zhu	Shizhang Li
15:00-15:30	Tea break			Tea break	
15:30-16:30	Shizhang Li	Xiangqian Yang		Xiangqian Yang	Xinwen Zhu

Note:

1 = Dingshisun Lecture Hall

2 = Wangxuan Lecture Hall

3 = Tea breaks served between every two sessions

Title and Abstract

Yiwen Ding(Peking University)

Title: Wall-crossings of $GL_n(K)$ -representations

Abstract: We first discuss the compatibility of the p -adic Langlands correspondence for $GL_2(\mathbb{Q}_p)$ with translation functors. Next, we propose conjectures concerning on the internal structure of the locally \mathbb{Q}_p -analytic representations of $GL_n(K)$ (for a p -adic field K), associated to n -dimensional p -adic Galois representations. In particular, we discuss how wall-crossing phenomenon in these $GL_n(K)$ -representations relate to the Hodge filtration of the corresponding Galois representations. We collect some results for $GL_2(\mathbb{Q}_p)$.

Yuanyang Jiang(Universit  Paris-Saclay)

Title: Locally analytic completed cohomology of Hilbert modular varieties

Abstract: We generalize a result of Lue Pan on locally analytic completed cohomology of modular curves to the case of Hilbert modular varieties. As an application, we prove that for parallel weight Hecke classes appearing in the completed cohomology of Hilbert modular varieties, de Rhamness of the associated Galois representation will imply classicality. We need to understand certain "partial de Rham cohomology", which we will prove to be classical by developing a version of Jacquet-Langlands transfer between different Shimura varieties. We will also talk about the plectic Lie algebra action in the joint work with Lue Pan.

Shizhang Li(Morningside Center of Mathematics)

Title: On cohomology of rational p -adic local systems

Abstract: Let X be a smooth proper rigid space over \mathbb{C}_p , and let L be a rational p -adic local system on X . In 2012 Scholze showed that the cohomology of L are finite dimensional \mathbb{Q}_p vector spaces if L has an integral lattice. Later on Kedlaya--Liu studied the general case (2016), and the topic is more recently revisited by Ansch tz--Le Bras--Mann (2024). The aim of this series of talks is to sketch a 'quick' proof of a result of ALBM. The main idea is to follow a strategy in an earlier work by Reinecke, Zavyalov and myself; one key ingredient involves concepts and results from condensed mathematics due to Clausen--Scholze and Andreychev. This is a joint work in preparation with Wiesława Nizioł, Emanuel Reinecke, and Bogdan Zavyalov

Longke Tang (Princeton University)

Title: Étale six-functor formalism and Grothendieck trace formula for Artin stacks

Abstract: The Grothendieck trace formula is a fundamental property of étale cohomology for varieties over finite fields and is a key step in the proof of Weil conjectures. Coincidentally, in the proof of Weil's another conjecture—the Tamagawa number conjecture—for curves over finite fields, the Grothendieck trace formula for the stack Bun_G also plays a crucial role. However, Gaiitsgory–Lurie, who carried out this proof, did not formulate the Grothendieck trace formula for general Artin stacks, due to underdevelopment of the theory of six-functor formalisms at the time. I will briefly review recent advances in six-functor formalism, use it to state the Grothendieck trace formula for general Artin stacks, and outline a possible proof strategy along with some related observations.

Xiangqian Yang(Peking University)

Title: On the generic part of the cohomology of Shimura varieties of abelian type

Abstract: We prove a torsion vanishing result for Shimura varieties of abelian type, generalize the results of Caraiani-Scholze, Koshikawa, Hamann-Lee, and others. We first establish a local-global compatibility result using Igusa sheaves, based on the construction of Igusa stacks by Daniels-van Hoften-Kim-Zhang and the unipotent categorical local Langlands correspondence established by Xinwen Zhu. Next, we show that the stalks of the Igusa sheaves are given by partially compactly supported cohomologies of Igusa varieties. Finally, we show that the Hecke actions on the unipotent local Langlands category are t -exact when restricted to the subcategory of objects supported on a generic parameter. This is a joint work with Xinwen Zhu.

Xinwen Zhu(Stanford University)

Title: Local Langlands category and the categorical local Langlands correspondence

Abstract: I will discuss an algebro-geometric approach to define the local Langlands category, which appears in the representation theoretic side of the categorical local Langlands correspondence. I will also explain the tame and the unipotent part of the categorical local Langlands correspondence.