

2023 Fudan Number Theory Seminar

2023 复旦数论会议

## 会议手册

**2023** 年 5 月 12-14 日  
复旦大学, 上海

# 2023 Fudan Number Theory Seminar 2023 复旦数论会议

**2023 年 5 月 12-14 日**  
复旦大学, 上海

## 邀请报告人 Speakers

李吉有 (上海交通大学)  
林永晓 (山东大学)  
王浩然 (清华大学)  
余世霖 (厦门大学)  
张鼎新 (清华大学)  
张子立 (同济大学)

## 组织委员会 Organizing Committee

任汝飞 (复旦大学)  
王海宁 (复旦大学)

## 主办单位 Sponsors

复旦大学数学科学学院  
上海数学中心

## 联系人 Contact

任汝飞 ([rufeir@fudan.edu.cn](mailto:rufeir@fudan.edu.cn))

## 日程安排 Schedule

会议地点: 复旦大学光华楼东主楼 1801

Venue: Fudan University, Guanghua East Main Tower 1801

5/12	下午
12:00 - 20:00	签到
5/13	上午
8:30 - 9:30	余世霖: Coadjoint orbit method and quantization
	茶歇
9:50 - 10:50	李吉有: Factorization of polynomials in short intervals
11:00 - 12:00	王浩然: On mod $p$ cohomology of Shimura curves
	午餐
5/13	下午
14:00 - 15:00	林永晓: Some applications of RH over finite fields to analytic number theory
	茶歇
15:20 - 16:20	张子立: $P=W$ conjecture and cluster varieties
16:30 - 17:30	张鼎新: Formal group laws associated to toric hypersurfaces
18:00	晚宴
5/14	全天
9:00 - 16:00	自由讨论

## 报告题目摘要 Titles & Abstracts

### 会议报告 Seminar Talks

报告人: 余世霖

题目: Coadjoint orbit method and quantization

摘要: The coadjoint orbit method of Kirillov and Kostant suggests that irreducible unitary representations of a Lie group can be constructed as geometric quantization of coadjoint orbits of the group. In the case of noncompact reductive Lie groups, Vogan reformulated the orbit method philosophy in terms of quantization of equivariant vector bundles on nilpotent coadjoint orbits. In this talk, I will propose a scheme to quantize coadjoint orbits using deformation quantization of symplectic varieties and their Lagrangian subvarieties. This is based on joint work with Conan Leung and ongoing project with Ivan Losev.

报告人: 李吉有

题目: Factorization of polynomials in short intervals

摘要: In this talk, we introduce the basic polynomial factorization problems over finite fields, which arise naturally from coding theory and graph theory. Then we present our recent results on the distribution of polynomials with a given number of distinct linear factors in short intervals beyond the Chebotarev density theorem. Joint work with Daqing Wan and Zhicheng Gao.

报告人: 王浩然

题目: On mod  $p$  cohomology of Shimura curves

摘要: The mod  $p$  local Langlands correspondence is well-understood for  $GL(2, \mathbb{Q}_p)$  by Breuil, Colmez, Emerton, Paskunas, et. al.. In order to understand the mod  $p$  Langlands program for higher rank groups, the study of the mod  $p$  cohomology of Shimura varieties seems to be an important approach. We will report some recent joint works with Yongquan Hu on the study of cohomology of Shimura curves.

报告人: 林永晓

题目: Some applications of RH over finite fields to analytic number theory

摘要: Progress on some classical questions in analytic number theory has been relied, via character sums of various shape, on the Riemann Hypothesis over finite fields as was proved by Deligne. We will discuss some applications of trace functions of  $l$ -adic sheaves in this regard and how trace functions interact with Fourier coefficients of automorphic forms.

报告人: 张子立

题目:  $P=W$  conjecture and cluster varieties

摘要: In the study of the topology of Hitchin systems, de Cataldo-Hausel-Migliorini conjectured a mysterious  $P=W$  identity, intertwining perverse sheaves and the mixed Hodge theory. Recent study indicates that such phenomenon should hold for more general varieties. In this talk, we will briefly introduce the background, and focus on an interesting algebro-combinatorial case: cluster varieties. The talk is not aiming for specialists.

报告人: 张鼎新

题目: Formal group laws associated to toric hypersurfaces

摘要: I will introduce Vlasenko's combinatorial construction of formal group laws, and explain how to deduce their integrality using rigid cohomology. As an application I'll explain how to obtain integrality theorems about hypergeometric functions from the above result.