# "樱花数下" 数论研讨会报告题目和摘要

### 陈永高：On $d$-complete sequences of integers

In 1996, Erdös and Lewin introduced the notion of $d$-complete sequences. A sequence $\mathcal{A}$ of positive integers is called d-complete if every sufficiently large integer can be represented as the sum of distinct terms taken from $\mathcal{A}$ such that no one divides any other. Let $p, q, r$ be three pairwise coprime integers not less than 2. In this paper, we establish a criterion for the $d$-completeness of the sequence $\{p^a q^b r^c : a, b, c = 0, 1, \cdots\}$. We also give an answer to the following question: how sparse a $d$-complete sequence can be? This is a joint work with Wang-Xing Yu.

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### 胡昊宇：Bounds of Betti numbers of wild étale sheaves

Calculating Betti numbers of étale sheaves on positive characteristic varieties is one of central goals in étale cohomology. The ramification invariant-Swan conductor controls Betti numbers of étale sheaves on curves, following Grothendieck-Ogg-Shafarevich formula in SGA5. In this talk, I will introduce a project on the upper bounds of Betti numbers for étale sheaves with wild ramifications on higher dimensional smooth varieties. The only ramification invariants that the bounds depend on are the Abbes-Saito's logarithmic conductors of sheaves at height 1 points. This is a joint work in progress with Jean-Baptiste Teyssier.

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### 胡悦科：Subconvexity problem for Rankin-Selberg and triple product L-functions within the conductor dropping range

In this talk I will report our recent progress on the subconvexity problem for the Rankin-Selberg L-function and triple product L-function, allowing joint ramifications and conductor dropping range. We follow and extend the method of Michel-Venkatesh, reducing the problem to a conjecture on existence of local test vectors satisfying certain conditions, and then verify these conditions in easier situations. This is joint work with Philippe Michel and Paul Nelson.

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### 黄炳荣：Arithmetic Quantum Chaos and L-functions

In this talk, I will introduce some aspects of the theory of arithmetic quantum chaos, focusing on the random wave conjecture for automorphic forms on the modular surface. I will present some results on the quantum unique ergodicity, the sup-norm, the $L^4$ norm, and the cubic moment of Hecke-Maass cusp forms. The proofs are based on the analytic theory of L-functions.

### 贾朝华：谈谈算术级数中的素数分布

算术级数中的素数分布在素数理论中占有重要的地位，关于它有着深入而广泛的研究。报告人将沿着历史的踪迹，对于这个领域中一些重要的理论和应用进行介绍。

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### 孙斌勇：Archimedean period relations and automorphic period relations

It was known to Euler that $\zeta(2k)$ is a rational multiple of $\pi^{2k}$, where $\zeta$ is the Euler-Riemann zeta function, and k is a positive integer. Following the pioneering works of G. Shimura, P. Deligne and etc., D. Blasius proposed a conjecture which asserts that similar rationality results hold for very general automorphic L-functions. We confirm Blasius's conjecture in two cases: the standard L-functions of symplectic type (joint with Dihua Jiang and Fangyang Tian), and the Rankin-Selberg L-functions for $\mathrm{GL}(n) \times \mathrm{GL}(n-1)$ (joint with Jian-Shu Li and Dongwen Liu). The key ingredient is the Archimedean period relations for the modular symbols at infinity. These two cases have been studied by many authors, including Harris-Lin, Grobner-Raghuram, Harder-Raghuram, Januszewski, Grobner-Lin, etc.

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### 孙智伟：与数论有关的行列式与积和式

本报告是与数论有关的行列式与积和式方面近年来结果的综述，涉及Legendre符号、单位根、错位排列、三角函数、有理函数与指数函数。我们也介绍一些这方面未解决的猜测供大家进一步研究。

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### 田野：Quadratic twists of elliptic curves

We introduce some recent progress on distribution of 2-Selmer groups and L-values in quadratic twist families of elliptic curves. This is based on joint work with Wei He, Jinzhan Pan and Wei Xiong.

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### 徐斌：On the structure of Arthur packets for real symplectic and orthogonal groups

The irreducible admissible representations of Arthur class are the local components of automorphic representations. They are conjectured to be parametrized by the Arthur parameters, and the set of irreducible representations associated with a single Arthur parameter is called an Arthur packet. For symplectic and orthogonal groups, the Arthur packets have been determined by Arthur, and their structure in the p-adic case can be understood in a very complicated way by the works of Moeglin, Xu, Atobe. In this talk, we would like to introduce some conjectures on their structure in the real case, which are motivated by the results in the p-adic case. This is an ongoing project with Taiwang Deng and Chang Huang.