



Mini-Workshop on Low-Dimensional Dynamical Systems and
Related Topics: Fractals and Dynamical Systems

Time: October 10 – October 12, 2026

(Arrival: October 10, 2026; Departure: October 12, 2026)

Venue: Room 1801, Guanghua East Main Building (Handan Campus)

Organizer: Guohua Zhang (Fudan University)

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Time	Talk	Speaker	Chair
October 11, 2026 (Room 1801)			
08:30-09:05	Survivor sets of Gauss map with a hole at $\frac{1}{2}$	Lingmin Liao	Kaizhi Wang
09:05-09:40	Some problems related to times 2 and times 3	Bing Li	
09:40-10:15	Asymptotic separation of periodic orbits and fractal dimension	Derong Kong	
Tea Break			
10:35-11:10	Power growth of mean-L-stable operators on Banach spaces	Jian Li	Hua Qiu
11:10-11:45	Almost countable spectrum and logarithmic Sarnak conjecture	Leiye Xu	
14:30-14:40 Group Photo			
14:40-15:15	Projections of regular fractal sets	Meng Wu	Baowei Wang
15:15-15:50	Dimensions of random Markov measures	Changhao Chen	
15:50-16:25	Dimension drop for intersections of Cantor sets	Yufeng Wu	
Tea Break			
16:45-17:20	On the fast Lyapunov spectrum for Markov Renyi maps	Yiwei Zhang	Xiao Ma
17:20-17:55	Polynomial multiple recurrence in prescribed residue classes	Jiahao Qiu	
17:55-18:30	可和群作用的比较性质与几乎有限性	Chunlin Liu	

Talk: Dimensions of random Markov measures

Speaker: Changhao Chen (Anhui University)

Abstract: I will talk about dimensions of random Markov measures generated by i.i.d. transition matrices on a finite state space. These measures are almost surely exact dimensional, with local dimension determined by an averaged entropy, and that their L^q -dimensions are governed by Lyapunov exponents of associated random matrix products. In contrast with several random cascade models exhibiting Fourier decay, a mild non-uniformity condition forces the random Markov measure to be almost surely non-Rajchman. Joint work with Hua Qiu and Qi Wang.

Talk: Asymptotic separation of periodic orbits and fractal dimension

Speaker: Derong Kong (Chongqing University)

Abstract: In this talk we will introduce a new critical value, called the periodic dimension, which quantifies the asymptotic separation of periodic orbits in a totally bounded metric dynamical system. When the dynamical system is induced by a self-similar iterated function system satisfying the strong separation condition, we show that the periodic dimension is equal to the self-similar dimension. Furthermore, under a quantitative separation condition on periodic orbits we show that the associated empirical periodic measures converge weakly to the normalized Hausdorff measure at its dimension. This is recent work joint with Zhiqiang Wang and Daohua Yu.

Talk: Some problems related to times 2 and times 3

Speaker: Bing Li (South China University of Technology)

Abstract: Let $b \geq 3$ be an integer and $C(b, D)$ be the set of real numbers in $[0, 1]$ whose base b -expansion only consists of digits in a set $S \subset \{0, 1, \dots, b-1\}$. Motivated by Mahler's problem, we consider how close can numbers in $C(b, D)$ be approximated by rational numbers with denominators being powers of some integer t . Some Hausdorff measure and dimension results will be given in the talk. The phenomena are different for the following three cases of b and t : (i) multiplicatively dependent; (ii) multiplicatively independent but have the same prime divisors; (iii) the left case.

Talk: 可和群作用的比较性质与几乎有限性

Speaker: Chunlin Liu (Dalian University of Technology)

Abstract: 动力系统中的比较性质关注这样一个基本问题：若两个集合在每一个不变概率测度下都满足严格的测度不等式，是否能够将其中较小的集合分解为有限多个部分，并分别通过群元素平移，使所得像彼此不交且全部包含在较大的集合中？对于 Cantor 空间上的极小 Z -作用，Glasner-Weiss 的经典结果对此给出了肯定回答。

本报告将介绍 Eli Glasner 与我近期关于一般可和群作用的相关工作。我们证明，每个可数无限离散可和群在非空紧 Hausdorff 零维空间上的连续作用都具有动力比较性质；这里不需要假设作用是极小的、自由的，也不需要空间可度量。证明的一个核心步骤是在 clopen type semigroup 中建立一个“三对二”比较原理，并将可和性、有限组合匹配以及零维空间中的 clopen 分解结合起来。

在极小 Cantor 作用的情形，我们进一步证明相应的 clopen type semigroup 具有消去性和 almost unperforation，并与 coinvariant group 的正锥自然同构，从而回答 Melleray 提出的若干问题。与此同时，我们研究不变测度的 affine evaluation，证明其 goodness，并说明 infinitesimal subgroup 恰好刻画“具有相同测度数据”与“能够由原作用实现 clopen 等分解”之间的障碍。

最后，通过将上述比较定理与 Kerr-Szabó 关于 almost finiteness 的理论结合，我们证明：可数无限离散可和群在具有 topological small boundary property 的紧可度量空间上的每个自由作用都是 almost finite。特别地，每个此类群在有限维紧可度量空间上的自由作用都是 almost finite，从而解决 Naryshkin 提出的 almost-finiteness 猜想。在极小情形，这些结果还进一步给出相应 crossed product 的 Z -稳定性、核维数至多为 1 等正则性结论。

Talk: Power growth of mean-L-stable operators on Banach spaces

Speaker: Jian Li (Shantou University)

Abstract: We show that every mean-L-stable operator satisfies $\|T^n\| = O(n)$ on every Banach space. On Hilbert spaces we prove that mean-L-stability is equivalent to absolute Cesàro boundedness. We also construct a positive topologically mixing operator T which is uniformly Kreiss bounded and has linear power growth, answering a question of Montes-Rodríguez, Sánchez-Álvarez and Zemánek (2005). Moreover, T is mean-L-stable and mean Li-Yorke chaotic, while it is not distributionally chaotic. This answers a question of Bernardes, Bonilla and Peris (2020). This is a joint work with Jie Li.

Talk: Survivor sets of Gauss map with a hole at 1

Speaker: Lingmin Liao (Wuhan University)

Abstract: Given $\alpha \in [0, 1]$, we study the set of numbers sharing identical representation of regular continued fractions and α -continued fractions.

It turns out that such set have the same Hausdorff dimension as that of a survivor set of the Gauss map with a hole at 1 , i.e., the set of points x such that all the iterations under Gauss map of x is less than α . We show that the function of the Hausdorff dimensions of such sets associated to α is a devil's staircase on $(0,1]$, i.e., continuous, increasing and locally constant almost everywhere on $(0,1]$. Further, we show that there is a jump at 0 , which is a new phenomenon in the study of open dynamical systems. This is a joint work with Cheng LIU.

Talk: Polynomial multiple recurrence in prescribed residue classes

Speaker: Jiahao Qiu (University of Science and Technology of China)

Abstract: For a minimal nilrotation on a compact connected nilmanifold, we prove that the polynomial diagonal orbit closure associated with any finite family of integer polynomials vanishing at the origin is connected. This settles a recent conjecture and yields syndetic polynomial multiple recurrence in prescribed residue class. This is joint work with Kangbo Ouyang and Xiangdong Ye.

Talk: Projections of regular fractal sets

Speaker: Meng Wu (Hunan University)

Abstract: I will discuss the dimension of orthogonal projections of regular (such as self-similar or Ahlfors regular) fractal sets, with a focus on the higher-dimensional setting.

Talk: Dimension drop for intersections of Cantor sets

Speaker: Yufeng Wu (Central South University)

Abstract: Let $E \subset \mathbb{R}$ be a self-similar set generated by a homogeneous iterated function system Φ with contraction ratio $\rho \in (0,1)$. Assume that Φ satisfies the open set condition and $\dim_{\text{H}} E < 1$. Let f be a C^1 -diffeomorphism on $\mathbb{R}$. We prove that if $\log|f'(x)|/\log\rho \notin \mathbb{Q}$ for every $x \in E \cap f^{-1}(E)$, then the upper Minkowski dimension of $f(E) \cap E$ is strictly less than the Hausdorff dimension of E . We also establish a quantitative dimension drop result when E is a missing-digit set and f is an affine map with rational slope satisfying a certain arithmetic condition. Based on these results and a previous result of Shmerkin (Ann. of Math., 2019), we obtain characterizations of γ in various contexts such that $\dim_{\text{M}}((\gamma E + \alpha) \cap E) < \dim_{\text{H}} E$ for every $\alpha \in \mathbb{R}$. Joint work with Lai Jiang, Bing Li, and Ruofan Li.

Talk: Almost countable spectrum and logarithmic Sarnak conjecture

Speaker: Leiye Xu (University of Science and Technology of China)

Abstract: In this paper, we introduce topological dynamical systems with almost countable spectrum. We prove that the Logarithmic Sarnak Conjecture holds for zero-entropy topological dynamical systems whose spectrum is almost countable. This class includes Anzai skew product on $\mathbb{T}^2$ over a rotation of $\mathbb{T}$, time-one maps of continuous suspension flows over rotations, systems with finite maximal pattern entropy, and bounded tame systems.

Talk: On the fast Lyapunov spectrum for Markov Renyi maps

Speaker: Yiwei Zhang (Anhui University of Science and Technology)

Abstract: In this talk, we study the multifractal analysis for Markov-Rényi maps, which form a canonical class of piecewise differentiable interval maps, with countably many branches and may contain a parabolic fixed point simultaneously, and do not assume any distortion hypotheses. We develop a geometric approach, independent of thermodynamic formalism, to study the fast Lyapunov spectrum for Markov-Rényi maps. Our study can be regarded as a refinement of the Lyapunov spectrum at infinity. We demonstrate that the fast Lyapunov spectrum is a piecewise constant function, possibly exhibiting a discontinuity at infinity. This is a joint work with Lulu Fang, Carlos Gustavo Moreira, and Zhichao Wang.