2025 冬季华东师范大学几何群论研讨会

Winter 2025 Geometric Group Theory Seminar at East China Normal University

会议日期：2025.12.5-2025.12.7

入住酒店：宝龙广场艺悦酒店

报到时间：2025.12.4 下午 14:00-18:00

报到地点：数学楼 102

组委会：邱瑞锋、邹燕清、王晁、万仁星

会议日程表			
时间	**报告人**	**题目**	**主持人**
12 月 5 日 周五 数学楼 102			
8:20-8:30	开幕式		
8:30-9:30	伍晓磊	Embed groups into acyclic groups	邹燕清
9:30-9:50	休息		
9:50-10:50	谷世杰	Nonembeddability of contractible open manifolds	邹燕清
10:50-11:00	休息		
11:00-12:00	王健	Contractible 3-manifolds and positive scalar curvature	邹燕清
12:00-14:00	午餐		
14:00-15:00	陶炳学	An extension theorem for quasimorphisms	万仁星
15:00-15:20	休息		
15:20-16:20	范遥	The Seifert motion group and its applications to graph manifolds	万仁星
16:20-16:30	休息		
16:30-17:00	崔嘉祺	A general construction of simultaneously hyperbolic elements	万仁星
17:00-19:00	晚餐		
12 月 6 日 周六 数学楼 102			
8:50-9:00	合影		
9:00-11:00	杨文元	Hausdorff dimension of non-conical and Myrberg limit sets: I	王晁
11:00-13:30	午餐		

会议日程表			
时间	**报告人**	**题目**	**主持人**
13:30-14:30	马彪	Superrigidity for groups acting on median spaces	韩素珍
14:30-14:50	休息		
14:50-15:50	叶圣奎	Some questions related to free-by-cyclic groups and tubular groups	韩素珍
15:50-16:00	休息		
16:00-16:30	丁力煌	Growth tightness of group quotients via confined subgroups and generating sets	韩素珍
16:30-17:00	刘恺睿	Martin boundary and geometric boundaries of groups	韩素珍
17:00-19:00	晚餐		
12 月 7 日 周日 数学楼 102			
9:00-11:00	杨文元	Hausdorff dimension of non-conical and Myrberg limit sets: II	王晁
11:00-14:00	午餐		
14:00-17:00	自由讨论		

报告题目与摘要

Embed groups into acyclic groups

伍晓磊 复旦大学

Abstract: We first discuss various embedding results for groups in the literature. Then we talk about how could one embed a group of type F_n into a acyclic group of type F_n. The embedding we have uses the labelled Thompson group which goes back to Thompson's Splinter group in the 1980s. We explain how one can show that the labeled Thompson group is always acyclic. This also allows us to build acyclic groups of type F_n but not F_{n+1} for any n. If time permitted, I will also discuss related results in the simple setting using the twisted Brin--Thompson groups. This is based on a joint work with Martin Palmer.

Nonembeddability of contractible open manifolds

谷世杰 东北大学

Abstract: In 1962, Kister and McMillan observed that a contractible open 3-manifold constructed by R. H. Bing cannot embed in S^3 (although every compact subset of it does). At the same time, they conjectured that Bing's example does not embed in any compact 3-manifold. Haken later confirmed this conjecture using his famous finiteness theorem. It is natural to ask whether Bing's example can embed in a more general compact space-for instance, a compact, locally connected, and locally 1-connected three-dimensional metric space. This question was answered in the negative by the speaker in 2021. However, that proof relies on covering-space theory and computer-assisted calculations, making the argument difficult to adapt for producing further examples; consequently, only two counterexamples are currently known.

In this talk we present an alternative (much shorter) proof based on a theorem of Weidmann that employs JSJ decomposition. Indeed, we give a lower bound for the rank of iterated Whitehead doubled knot groups. If time permits, I will talk about how to construct infinitely many contract open 3-manifold which embed in no compact, locally connected and locally 1-connected 3D metric space. This is joint work with Jian Wang and Yanqing Zou.

Contractible 3-manifolds and positive scalar curvature

王健 中国科学院数学与系统科学研究院

Abstract: In this talk, we will study contractible 3-manifolds and its relationship with positive scalar curvature. For example, Whitehead manifold is a contractible 3-manifold, but not homomorphic to 3-dimensional Euclidean space. We will give a proof that Whitehead manifold does not have a complete metric with positive scalar curvature.

An extension theorem for quasimorphisms

陶炳学 京都大学

Abstract: In recent years, one active area of research on quasimorphisms has been the extension problem--that is, whether a quasimorphism defined on a subgroup can be extended to a quasimorphism on the whole group. This problem is important in the study of bounded cohomology, stable commutator length, and also symplectic geometry.

In this talk, I will give a new condition for extendability of quasimorphisms. I will show how this condition reproves a result of Hull and Osin and also applies to many other situations. By considering certain group-theoretic Dehn filling of mapping class groups, we give an answer to a question asked by Fournier-Facio, Mangioni, and Sisto.

The Seifert motion group and its applications to graph manifolds

范遥 同济大学

Abstract: This talk explores the geometry of the universal cover of SL(2,R), one of the eight Thurston geometries. We begin by introducing its isometry group, whose identity component is the Seifert motion group. We will then discuss key properties of this group, such as the conjugacy classes and commutators. Finally, we employ these properties to construct representations for graph manifolds and present several theorems.

A general construction of simultaneously hyperbolic elements

崔嘉祺 华东师范大学

Abstract: In this short talk, we introduce some recent progress on the following basic question: Suppose a group G acts non-trivially on finitely many Gromov-hyperbolic spaces X_1,⋯,X_n. Does there exist an element g\in G so that it is hyperbolic on every X_i? We will give an affirmative answer to this question and show that such elements have positive density with respect to the word metric. This is a joint work with Renxing Wan.

Hausdorff dimension of non-conical and Myrberg limit sets

杨文元 北京大学

Abstract: In this mini-course, we study the Hausdorff dimensions of non-conical and Myrberg limit sets for groups acting on negatively curved spaces. In a joint work with Mahan Mj, we establish maximality of the Hausdorff dimension of the non-conical limit set for Fuchsian groups, Kleinian groups and groups actings on trees. We also show that the Hausdorff dimension of the Myrberg limit set is the same as the critical exponent confirming a conjecture of Falk-Matsuzaki.

The mini-course will first cover preliminary materials about the topological dynamics on the limit set, the Cheeger constant and amenability, and finally present a full proof of the results in Fuchsian groups and in trees.

Superrigidity for groups acting on median spaces

马彪 同济大学

Abstract: Median spaces have recently begun to play an increasingly significant role in geometric group theory. In this talk, I will explain how to use Bader-Furman's dynamical approach to study superrigidity for groups acting on finite-rank median spaces, thereby providing a novel proof of superrigidity for homomorphisms. If time permits, I will also report on our recent progress concerning superrigidity for group actions on infinite-rank median spaces. This talk is based on joint work with Indira Chatterji and Lamine Messaci.

Some questions related to free-by-cyclic groups and tubular groups

叶圣奎 上海纽约大学

Abstract: We prove that a CAT(0) free-by-cyclic tubular group with one vertex is virtually special, but many of them cannot virtually act freely and cocompactly on CAT(0) cube complexes. This partially confirms a question of Brady--Soroko and answers a question of Lyman in the negative. Furthermore, we provide examples of free-by-cyclic groups amalgamated along cyclic subgroups that are not virtually free-by-cyclic. This answers negatively a question of Hagen--Wise. Lastly, we exhibit an example of a cyclic-subgroup-separable tubular group that does not have the property (VRC) (i.e. every cyclic subgroup is a virtual retract). This answers a question of Minasyan in the negative. This is a joint work with Xiaolei Wu.

Growth tightness of group quotients via confined subgroups and generating sets

丁力煌 北京大学

Abstract: Following from Grigorchuk and de la Harpe, a group is called growth tight if its growth rate drops when you pass to an infinite quotient. This property has established for many classical hyperbolic and relatively hyperbolic groups, and it is a subtle feature of negative curvature. This talk will discuss progresses in the growth tightness theorem for quotients of a group by confined subgroups. We show that groups admitting a statistically convex-cocompact action with contracting elements satisfy the growth tightness property for confined subgroups. This framework allows us to resolve a significant case for mapping class groups: we demonstrate that they are growth tight for infinitely many generating sets, making substantial progress toward a conjecture of Arzhantseva, Cashen and Tao.

This talk is based on two pieces of joint work with Wenyuan Yang and with Dídac Martínez-Granado and Abdul Zalloum, respectively.

Martin boundary and geometric boundaries of groups

刘恺睿 北京大学

Abstract: In this talk, we will introduce the Martin boundary of groups-a compactification arising from random walks on groups that completely characterizes all non-negative harmonic functions on groups. We focus on the connections between this probability-related boundary and various geometric boundaries of groups.

We begin by reviewing some results in hyperbolic and relatively hyperbolic groups. Then we introduce Ancona inequalities, which describe the multiplicative behavior of Green functions along geodesics. A key result we present is the construction of an injective mapping from a full-measure subset of the Roller boundary to the Martin boundary for some right-angled Coxeter groups. For general groups with contracting elements, most aspects of this construction remain valid. This is based on a joint work with Wenyuan Yang.

参会人员名单

曹鑫文	华东师范大学
陈皓	华东师范大学
陈永琦	华东师范大学
崔嘉祺	华东师范大学
刁文杰	华东师范大学
丁力煌	北京大学
段剑儒	北京大学
范遥	同济大学
谷世杰	东北大学
韩素珍	湖南大学
韩肖垄	上海数学与交叉学科研究院
黄晓铭	复旦大学
黄煜	北京大学
黄禹超	东北大学
李初阳	华东师范大学
李友林	上海交通大学
刘恺睿	北京大学
刘洋	华东师范大学

马彪	同济大学
马继明	复旦大学
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史尚君	华东师范大学
宋典毅	北京大学
陶炳学	京都大学
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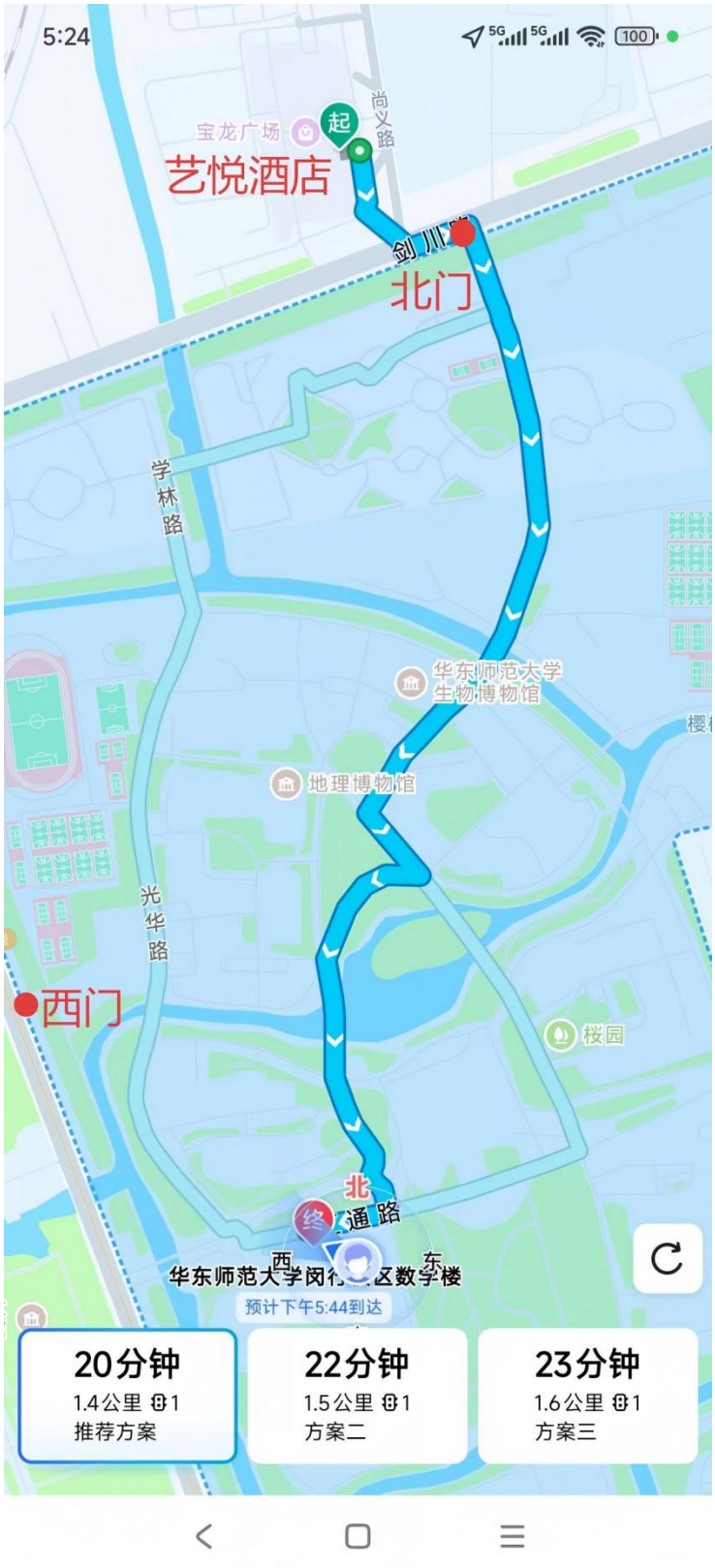
叶圣奎	上海纽约大学
余斌	同济大学
赵梦飞	复旦大学
郑芳婷	西交利物浦大学
邹燕清	华东师范大学



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