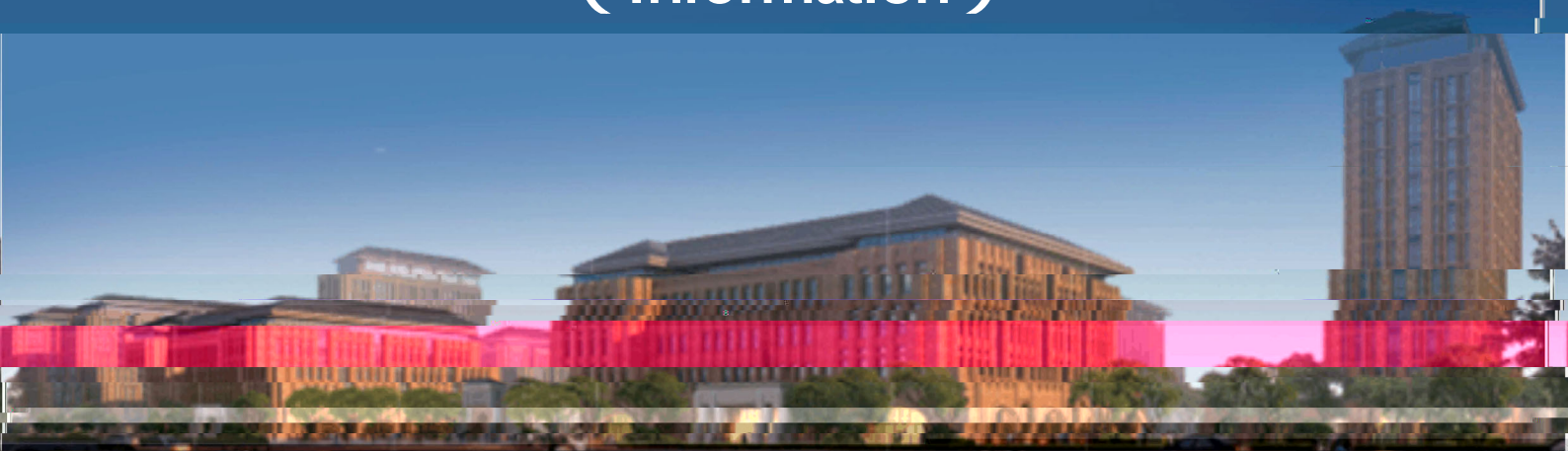School of Mathematical Sciences
Zhejiang University

数学科学学院

Symposium on Number Theory and Representation Theory

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Information

Symposium on Number Theory and Representation Theory

A Um%4 - May %6, 2021 Zhejiang University
Hangzhou, China

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Organizers:

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Time:
9:00-11:40am, 2:00-5:40pm, May 14-May 16

Venue:
Sir Run Run Shaw Science Building 211, Yuquan Campus, Zhejiang University,
< Ub [n\ ci (浙江大学邵逸夫科学馆211)

School of Mathematical Sciences
Zhejiang University, Hangzhou, China

Meeting on 14-16 May 2021

	2021/5/14	2021/5/15	2021/5/16
9:00-9:20	Sign in		
9:20-10:20	**Bingrong Huang**	**Qinghua Pi**	**Zhifeng Peng**
10:20-10:40	Tea Break		
10:40-11:40	**Ning Li**	**Sarah Dijols**	**Ping Xi**
11:40-12:00	Lunch and noon break		Tea Break
12:00-13:00			**Xiaolei Wan**
13:00-14:00			Lunch
14:00-15:00	**Bin Xu**	**Liuquan Wang**	
15:00-15:20	Tea Break	Tea Break	
15:20-16:20	**Wen Wei Li**	**Kei Yuen Chan**	
16:20-16:40	Tea Break	Tea Break	
16:40-17:40	**Jun Yu**	**Jiajun Ma**	
18:00	Dinner	Banquet	

Title and Abstract

Time: 9:00 11:40am, 2:00 5:40pm, May 14 May 16
Venue: Sir Run Run Shaw Science Building 211, Yuquan Campus, Zhejiang University

Speaker Bingrong Huang（黄炳荣）
Affiliation Shandong University
Title Quantum variance for automorphic forms

Abstract In this talk, we will present results on the quantum variances for Eisenstein series and for dihedral Maass forms on modular surfaces. The resulting quadratic forms are compared with the classical variance (Ratner) and the quantum variance for cusp forms (Luo Sarnak). They coincide after inserting certain subtle arithmetic factors, including the central values of certain L functions. (Based on joint work with Stephen Lester.)

Speaker Ning Li（李宁）
Affiliation Beijing International Center for Mathematical Research
Title: Degenerate principal series representations and nilpotent invariants

Abstract: In this talk, we will discuss two geometric invariants: wave front cycles and associated cycles, attached to irreducible constitutes of degenerate principal series representations of 2 , . The main strategy is to combine the explicit description of these constituents obtained by Lee and Zhu and the machinery of "theta lift" of nilpotent orbits via moment maps.

Speaker Bin Xu（徐斌）
Affiliation: Yau Mathematical Sciences Center
Title Functoriality of endoscopic transfer for general symplectic and even orthogonal groups

Abstract: Langlands' functoriality conjecture reveals a deep connection of automorphic representations among different reductive groups. Most known cases of functoriality fit into the theory of endoscopy, which concerns a group G and its endoscopic groups. We study the endoscopic theory for G being a quasisplit general symplectic or even orthogonal group over a number field, and prove the functoriality of endoscopic transfer for tempered automorphic representations of these groups under some technical assumption.

Speaker Wen Wei Li (李文威)

Affiliation B I C M

Title Full stable trace formula for the group $\widetilde{Sp}(2n)$

Abstract The metaplectic covering $\widetilde{Sp}(2n)$ of $Sp(2n)$ plays a pivotal role in various aspects of representation theory and arithmetics. In order to harness the full power of Arthur's methods in this setting, we need a stable trace formula for $\widetilde{Sp}(2n)$. Thus far, only the elliptic terms have been stabilized. In this talk, I will report an ongoing work on the full stabilization, which will hopefully grant access to the whole genuine discrete automorphic spectrum of $\widetilde{Sp}(2n)$, for general n. This is based on the techniques of Arthur and Moeglin Waldspurger, who worked with linear reductive groups or their twisted analgoues.

Speaker Jun Yu ( )

Affiliation Beijing International Center for Mathematical Research

Title Restriction of unitary representations of Spin(N,) to parabolic subgroups

Abstract: The orbit method predicts a relation between restrictions of irreducible unitary representations and projections of corresponding coadjoint orbits. In this talk we will discuss branching laws for unitary representations of Spin(N,) restricted to parabolic subgroups and the corresponding orbit geometry. In particular, we confirm Duflo's conjecture in this setting. This is a joint work with Gang Liu (Lorraine) and Yoshiki Oshima (Osaka).

Speaker Qinghua Pi (皮庆华)

Affiliation Shandong University , Weihai

Title Some results on automorphic forms of cubic level

Abstract With the methods of the relative trace formula and the classification of simple supercuspidal representations, we estabilish some Fourier formulas for automorphic new forms for
of cubic level. As applications, we prove some results on the non vanishing of modular L values, the weighted Weyl's law and the bias of root numbers. This talk is based on the joint works with Yingnan Wang, Lei Zhang and Zhi Qi.

Speaker Sarah Dijols

Affiliation Yau Mathematical Sciences Center

Title The completed L function for

Abstract This talk is based on a joint work (recently submitted) where we obtain the functional equation of the completed L function for modular forms on
. The first part of the talk will cover the Rankin Selberg method, and explain the adaptations needed to treat the case of .

Speaker Liuquan Wang（ 王六权）
Affiliation: Wuhan University
Title Representations of mock theta functions

Abstract Motivated by the works of Liu, we provide a unified approach to find Appell Lerch series and Hecke type series representations for mock theta functions. We establish a number of parameterized identities with two parameters a and b. Specializing the choices of , , we not only give various known and new representations for the mock theta functions of orders 2, 3, 5, 6 and 8, but also present many other interesting identities. We find that some mock theta functions of different orders are related to each other, in the sense that their representations can be deduced from the same , parameterized identity. Furthermore, we introduce the concept of false Appell Lerch series. We then express the Appell Lerch series, false Appell Lerch series and Hecke type series in this work using the building blocks , , and , , , , introduced by Hickerson and Mortenson, as well as , , and , , , , introduced in this paper. We also show the equivalences of our new representations for several mock theta functions and the known representations. This talk is based on a joint work with Dandan Chen.

Kei Yuen Chan
Affiliation Shanghai Center for Mathematical Sciences
Title Ext-vanishing phenomenon in branching laws of classical groups

Abstract Ext-vanishing is useful in the study of cohomology of representations. A classical example of Ext-vanishing is that there are no higher extensions between two discrete series of a reductive groups over local fields. In the context of branching laws of classical groups, D. Prasad predicts higher Ext-vanishing between tempered representations (or more generally generic representations). In this talk, I shall explain various examples of Ext-vanishing, including conjectures, old and new results. Results are centered around general linear groups, in which a main tool-- left-right derivatives will also be explained if time permits.

Speaker Jajun Ma（ 马家骏）
Affiliation Shanghai Jao Tong University
Title Special unipotent representations of real classical groups and theta correspondence.

Abstract Special unipotent representations of a real reductive group are certain irreducible admissible representations attached to the nilpotent orbits of its dual group. Barbasch and Vogan established the theory of special unipotent representations for complex reductive groups (construction, unitarizability, etc.) in the '80s.
In this talk, I will discuss the recent joint work with Dan Barbasch, Binyong Sun, and Chengbo Zhu on the classification and unitarity of special unipotent representations of the real classical groups (real symplectic groups, real orthogonal groups, and the metaplectic groups).

Speaker: Zhifeng Peng(彭志峰)

Affiliation: Soochow University

Title The representation classification of the exceptional group

Abstract

In 2002, Assume the fundamental lemma, Arthur given a stabilization of the trace formula by the endoscopic theory.

In 2008, Ngo proved the fundamental lemma.

In 2013, Arthur classified the automorphic representations of classic groups by the twisted trace formula of   and the standard trace formula of classic groups, when the twisted trace formula holds.

In 2014, Waldspurger built the twisted trace formula for the reductive groups. Our goal is to give the endoscopic classification of automorphic representations of execptional group by the twisted trace formula of 8 , and the standard trace formula of   .

In this talk, we will introduce the basic objects and background.

Speaker Ping Xi(郗平)

Affiliation Xi'an Jiaotong University

Title Lang Trotter conjecture for CM elliptic curves

Abstract: For any elliptic curve   over   and any non zero integer   , the Lang Trotter conjecture has predicted the asymptotic behaviours of the number of good primes   , denoted by   ,   , such that the Frobenius trace of   at   is equal to the given integer . Quite recently, we are able to prove an estimate for   ,   which confirms the upper bound part of the conjecture for CM elliptic curves. Moreover, intimate connections of this conjecture and Hardy Littlewood conjecture can also be established to characterize the shape of the Lang Trotter constant in   ,   . This is based on the joint work with Daqing Wan (in progress).

Speaker Xiaolei Wan(万小磊)

Affiliation: Beijing International Center for Mathematical Research

Title Sakellaridis Venkatesh conjecture and theta correspondence

Abstract In this talk, I will introduce the Sakellaridis Venkatesh conjecture on the decomposition of global period, and give examples related to this conjecture. More specifically, the case $2 \backslash$ 5 . I will determine the Plancherel decompositions of   _ , where v is a local place. Then I will prove the local relative character identity. In the global setting, I will give the factorization of the global period of $2 \backslash$ 5 , where the local functional comes from the local Plancherel decomposition. The example $2 \backslash$ 5 is slightly beyond the SV conjecture but we still have a decomposition of the global period as the sum of two factorizable elements.