Conference "Women in automorphic forms"

Sept 5 – 7, 2018

SCHEDULE

Schedule	**Wednesday**	**Thursday**	**Friday**
09.00 – 09.50		**Maurischat**	**Marzec**
10.00 – 10.30		Coffee break	Coffee break
10.30 – 11.20		**Goujard**	**Falliero**
11.30 – 12.30		**Speed talks by Mocanu, Bianci, Kupka, Sachdeva**	**Speed talks by Majumder, Röhrig, Gerbelli-Gauthier**
12.30 – 14.00	13.00 Registration	Lunch break	Lunch break
14.00 – 14.50	**Moeglin**	**Fintzen**	**Matz**
15.00 – 15.30	Coffee break	Coffee break	Coffee break
15.30 – 16.20	**Wendland**	**Ludwig**	**Pohl**
16.30 –	18.30 Conference dinner	16:30 Reception	Departure

LOCATION

The lectures take place in the

Lecture Hall 23 ("Hörsaal 23")

which is situated on the ground floor of building S1|03, Hochschulstraße 1, 64289 Darmstadt. The coffee breaks take place in "Seminarraum 12" which is situated on the ground floor of the same building.

CONFERENCE DINNER

The conference dinner is scheduled for **Wednesday, September 5th, at 18.30**. The venue for this dinner is the restaurant Sardegna, Kahlertstraße 1, 64293 Darmstadt, which is in a 10 minutes walking distance from the lecture hall.

RECEPTION

The reception is scheduled for **Thursday, September 6th, at 16.30**. It takes place in "Seminarraum 12" which is situated on the ground floor of building S1|03, Hochschulstraße 1, 64289 Darmstadt.

TITLES AND ABSTRACTS

Thérèse Falliero

Some properties of hyperbolic Eisenstein series

Hyperbolic Eisenstein series are automorphic functions analogically defined to "classical" Eisenstein series. We give the construction of hyperbolic Eisenstein series on a geometrically finite hyperbolic Riemann surface and some of their properties. Although less "famous" than their classical equivalents, we will see some of their applications.

Jessica Fintzen

Representations of p-adic groups

Understanding the representations of p-adic groups is crucial for many problems in the theory of automorphic representations and automorphic forms. The building blocks for representations of p-adic groups are called supercuspidal representations. I will survey what is known about the construction of supercuspidal representations, mention questions that remain mysterious until today, and explain some recent developments. (I will not assume that the audience knows supercuspidal representations.)

Elise Goujard

Flat surfaces and quasimodular forms (j.w. Martin Möller)

Counting torus and sphere covers is very useful to evaluate volumes of moduli spaces, in particular moduli spaces of flat surfaces. We prove the quasimodularity of generating functions for counting such covers, analyzing decompositions of flat surfaces into horizontal cylinders. We show how these quasimodular forms arise as contour integral of generalized Jacobi forms. This work provides an alternative proof of the quasimodularity results of Bloch–Okounkov, Eskin–Okounkov and Chen–Möller–Zagier, and generalizes the results of Böhm–Bringmann–Buchholz–Markwig for simple ramification covers.

Judith Ludwig

An introduction to p-adic automorphic forms

This talk is an introduction to the theory of p-adic automorphic forms. After explaining Serre's definition of a p-adic modular form, I will give an overview of the theory for more general groups. I will explain how to organize p-adic automorphic forms into geometric families, which opens up the theory to the toolbox of non-archimedean geometry. Towards the end of the talk we will catch a glimpse of the p-adic Langlands program.

Jasmin Matz

Limit multiplicities in $\mathrm{SL}(2,\mathbb{R})^r \oplus \mathrm{SL}(2,\mathbb{C})^s$

Let G be a semisimple Lie group with unitary dual $\widehat{G}$, and Γ a co-finite lattice in G. Γ can be used to define a measure μ_Γ on $\widehat{G}$ in a natural way. An obvious question is, whether μ_Γ tends to the Plancherel measure on $\widehat{G}$ as Γ varies over a family of co-finite lattices with $\mathrm{vol}(\Gamma\backslash G) \to \infty$. This has been proven to be true in many situations in which the lattices are either commensurable with each other, uniform in G, or $G = \mathrm{SL}(2,\mathbb{R})$ or $\mathrm{SL}(2,\mathbb{C})$. In my talk I want to discuss this problem for the natural family of lattices $\mathrm{SL}(2,\mathcal{O}_F)$ in $G = \mathrm{SL}(2,\mathbb{R})^r \oplus \mathrm{SL}(2,\mathbb{C})^s$ when F runs over all number fields with fixed archimedean signature (r,s) and $\mathcal{O}_F$ is the ring of integers in F.

Jolanta Marzec

Maass relations for Saito-Kurokawa lifts of higher levels

Classically, Saito-Kurokawa lifting is an injective mapping from the space of modular forms of level 1 to the space of Siegel modular forms of degree 2 such that the functions in the image violate generalized Ramanujan-Petersson conjecture. The first construction of such a lifting was given by Maass who exploited correspondences between various modular forms. The image consisted of functions whose Fourier coefficients satisfied what we now call the Maass relations. One can generalize this mapping to include modular forms of higher levels. However then, classical constructions become fairly complicated and it is not clear whether they still imply (a version of) Maass relations. We show that this is indeed the case by generalizing a representation theoretical approach of Pitale, Saha and Schmidt from level 1 to higher levels.

Kathrin Maurischat

Sturm's operator for holomorphic projection – tops and flops

We discuss Sturm's convolution method for the description of the orthogonal holomorphic projection for Siegel modular forms. This depends on the existence of an appropriate system of Poincaré series. We present results for small weights as well as for vector valued modular forms. We show that for the critical weight rank +1 Sturm's operator fails, and give a spectral theoretic interpretation.

Colette Moeglin

About the multiplicity in the space of the square integrable automorphic forms

I will explain what is known about the multiplicity in the space of the square integrable automorphic forms mainly in the case of classical groups. In particular I will explain that we have multiplicity one for unitary groups and what is missing for having the same result for other classical groups (avoiding all the technicalities).

Anke Pohl

Selberg zeta functions with twists of non-expanding cusp monodromies

The Selberg zeta function Z of a hyperbolic surface X is a generating function for the geodesic length spectrum of X. It is a deep and influential result that the zeros of Z encode the L^2-eigenvalues and resonances of the Laplacian of X, thereby showing e.g. an intimate relation between the geometric and spectral properties of the surface X. We report on the current status of a project to generalize these results to Selberg zeta functions that are twisted by certain non-unitary representations. This is joint work with Ksenia Fedosova.

Katrin Wendland

Mathieu Moonshine from a conformal field theorist's point of view

The complex elliptic genus of a K3 surface is an example of a weak Jacobi form of weight zero and index one. It also occurs in conformal field theory, where it has a natural decomposition into characters of a certain infinite dimensional super Lie algebra. In 2010, mathematical physicists Eguchi, Ooguri and Tachikawa made a remarkable observation: the coefficients in this decomposition seem to be directly linked to the representation theory of one of the sporadic groups, namely the Mathieu group M_{24}. The observation, nowadays known as "Mathieu Moonshine", is mysterious to the very day.
The talk will give an introductory overview on the ingredients and current status of Mathieu Moonshine, from a conformal field theorist's point of view.

SPEED TALKS

Francesca Bianci

Chabauty–Coleman experiments for genus 3 hyperelliptic curves

I will present an implementation of the Chabauty–Coleman method to find rational points on genus 3 hyperelliptic curves defined over $\mathbb{Q}$ whose Jacobians have Mordell–Weil rank 1. Some interesting examples from computations on a large database will be discussed. This is joint work with Jennifer Balakrishnan, Victoria Cantoral-Farfán, Mirela Çiperiani and Anastassia Etropolski.

Mathilde Gerbelli-Gauthier

Cohomology growth in towers and the stable trace formula

I will discuss ongoing work on the computation of the growth of Betti numbers in a congruence tower of cocompact arithmetic lattices. In the cases considered, the cohomological representations in low degree arise as endoscopic transfers and the growth can be computed inductively using the stable trace formula.

Jennifer Kupka

Mock modular forms and traces of singular moduli

In his last letter to Hardy, Ramanujan defined a number of functions which he called "mock theta functions". These functions are given as q-hypergeometric series and are grouped by a quantity Ramanujan called "order". Among mock theta functions of the same order there hold several linear relations and Ramanujan claimed many more properties of mock theta functions, some of them still unproven.
We will present algebraic formulas for the coefficients of the mock theta functions of order 7, which are given in terms of traces of singular moduli. To this end we use the fact that mock theta functions can be grouped and completed to obtain the holomorphic part of a harmonic weak Maass form of weight $1/2$ transforming with respect to the Weil representation. We then write this harmonic weak Maass form as the Millson theta lift of a suitable weakly holomorphic modular form of weight 0 and obtain the desired formulas by comparing coefficients.

Priyanka Majumder

Estimates for the Bergman kernel associated to the space of cusp forms

This talk will explain optimal estimates for the Bergman kernel associated to cusp forms of higher weight for cofinite Fuchsian subgroups of $\mathrm{PSL}_2(\mathbb{R})$, and also reprove the estimates for the Bergman kernel along the diagonal.

Andreea Mocanu

Newform theory for Jacobi forms

In this short talk, we introduce certain level raising operators defined on spaces of Jacobi forms of lattice index, which arise from isometries between lattices. We discuss some of their properties and the connection with a theory of newforms for Jacobi forms.

Christina Röhrig

Siegel modular forms associated to indefinite quadratic forms

Vignéras showed that there exists a simple criterion for generating (almost holomorphic) modular forms associated to an indefinite quadratic form on $\mathbb{R}^n$, i.e., by solving a second-order differential equation examples in the form of theta series may be obtained. In this talk we'll discuss how to generalize those results for Siegel modular forms.

Gunja Sachdeva

An Automorphic translation of Deligne's conjecture: Special values of L-functions for $\mathrm{GL}(n) \times \mathrm{GL}(m)$ over a number field

In the talk I will discuss algebraicity results for all the critical values of certain Rankin–Selberg L-functions attached to a pair of automorphic representations on $\mathrm{GL}(n) \times \mathrm{GL}(m)$ over a number field. These results are derived from the theory of L-functions by giving a cohomological interpretation to an integral representing a critical L-value in terms of Poincaré pairing.