

Gaetan Chenevier: Unimodular hunting

I will explain how to classify the unimodular integral lattices of rank 26 and 27.

Shouhei Ma:

Universal holomorphic symplectic varieties and Borcherds products.

We establish a correspondence between canonical forms on the n -fold universal family of polarized holomorphic symplectic varieties and cusp forms on the period domain, and give application to the Kodaira dimension. For the moduli of n -pointed K3 surfaces, we have a refined result for pluricanonical forms. For K3 surfaces of small genus (Mukai model) and known explicit families of IHS, we study transition of Kodaira dimension by comparing application of Borcherds products and geometric construction.

Riccardo Salvati Manni

On the Kodaira dimension of A_6 .

I will report on the Kodaira dimension of the moduli space of principally polarized abelian varieties $A_n(\mathbb{C})$, i.e. of the pairs (A, Θ) with A an abelian variety and Θ a principal polarization. Recently, in M. Dittmann, R. Salvati Manni, N. Scheithauer: Harmonic theta series and the Kodaira dimension of A_6 , preprint arXiv:1909.07062, we gave explicitly a bicanonical holomorphic differential forms on A_6 . I will explain this construction. Hence, using previous results due to Tai, Freitag, Mumford, Clemens, Donagi, Verra, we have that A_n is unirational if and only if $n \leq 5$.

Steve Kudla: On the subring of special cycles on orthogonal Shimura varieties.

Abstract: By old results with Millson, the generating series for the cohomology classes of special cycles on orthogonal Shimura varieties over a totally real field are Hilbert–Siegel modular forms. These forms arise via theta series. Using this result and the Siegel–Weil formula, we show that the products in the subring of cohomology generated by the special cycles are controlled by the Fourier coefficients of triple pullbacks of certain Siegel–Eisenstein series.

As a consequence, there are comparison isomorphisms between special subrings for different Shimura varieties. In the case in which the signature of the quadratic space V is $(m, 2)$ at an even number d_+ of archimedean places, the comparison gives a 'combinatorial model' for the special cycle ring in terms of the associated totally positive definite space.

Gavril Farkas: New results on the Kodaira dimension of M_g

Giulio Codogni: Vertex algebras and Teichmüller modular forms

I will associate to any holomorphic vertex algebra a collection of Teichmüller modular forms, one in each genus. In genus one, this form is just the character of the vertex algebra, and I will thus reprove Zhu's modularity result. In higher genus, I will show that these forms have an expansion in terms of the correlation functions of the vertex algebra. I will explain applications to the Schottky problem, to the study of the slope of the effective cone of the moduli space of curves, and to the classification of holomorphic vertex algebras. In particular, I will show the uniqueness result for high genera partition functions of the moonshine vertex algebra.

Ben Howard: Arithmetic volumes of unitary Shimura varieties.

Abstract: The integral model of a $GU(n-1,1)$ Shimura variety carries a natural metrized line bundle on it. Viewing this metrized line bundle as a class in the codimension one arithmetic Chow group, one can define its arithmetic volume as an iterated self-intersection. Using the theory of Borcherds products and an inductive argument, we show that this volume can be expressed in terms of logarithmic derivatives of Dirichlet L-functions at integer points. This is joint work with Jan Bruinier.

Haowu Wang:

Free algebras of modular forms on type IV symmetric domains

It is a classical problem to determine the algebra of automorphic forms on symmetric domains. The first breakthrough was due to Igusa, who proved in 1962 that the algebra of genus 2 Siegel modular forms of even weight is freely generated by four forms of weights 4, 6, 10, 12. In this talk, we introduce a new approach to classify and construct free algebras of modular forms on symmetric domains of type IV. We first establish a sufficient and necessary condition for the graded algebra of orthogonal modular forms being free. We then deduce an explicit classification result and present more than 70 free algebras which recover all known examples in the literature. This greatly extends Igusa's theorem. This talk is partly based on joint work with Brandon Williams.

Juerg Kramer:

On formal Fourier-Jacobi expansions.

It is a classical fact that Siegel modular forms possess so-called Fourier-Jacobi expansions. The question then arises, given such an expansion, when does it originate from a Siegel modular form. In the complex setting, J. Bruinier and M. Raum gave a necessary and sufficient criterion when Fourier-Jacobi expansions give rise to Siegel modular forms. In our talk we would like to revisit this problem using the arithmetic compactifications of the moduli space of principally polarized abelian varieties established by G. Faltings and C.-L. Chai.

Claudia Alfes: Harmonic Maass forms and periods

Abstract:

We report on recent work on the relation of coefficients of harmonic weak Maass forms of half-integral weight and periods of associated differentials. This generalizes work of Bruinier and Bruinier and Ono who investigated the situation in the case that the harmonic Maass form has weight $1/2$. (This is joint work in progress with Jan Bruinier and Markus Schwagenscheidt.)

Christophe Ritzenthaler:

Modular forms in small dimensions: geometry and arithmetic.

Kathrinn Bringmann: Modular properties of false theta functions.

In my talk I will explain how false theta functions can be "completed" to obtain modular-type objects in the spirit of Ramanujan's mock theta functions. I will then discuss applications. Most of this is joint work with Caner Nazaroglu.

Duco van Straten: Calabi-Yau incarnation of the Siegel paramodular form of level 61.

In the talk I will describe work in progress on a larger project that aims at finding explicit Calabi-Yau threefolds that realise in their third cohomology the Galois-representation attached to Siegel paramodular forms of lowest possible levels 61, 73, 79,.... This can be seen as the very first steps to create a list that can be compared with Cremona's list of elliptic curves that starts with the elliptic curve $X_0(11)$. (joint work with V. Golyshev and others)

Cris Poor : Paramodularity of abelian surfaces I.

According to the Paramodular Conjecture, abelian surfaces of conductor N with minimal endomorphisms defined over \mathbb{Q} have their modularity shown by weight two paramodular newforms for the paramodular group $K(N)$. We survey data for $N < 1000$.

David Yuen

Paramodularity of abelian surfaces II

We highlight twisting of paramodular forms and lifting of Hilbert and Bianchi forms to paramodular forms, theories that are consistent with the twisting of abelian surfaces and with Weil restriction. We describe the proofs of modularity for a few examples. We indicate recent results on levels N that are not squarefree.

Martin Moeller : Towards the Kodaira dimension of moduli spaces of abelian differentials.

Strata of abelian differentials are subvarieties of the moduli space of pointed stable curves $M_{\{g,n\}}$ parametrizing curves with abelian differentials of prescribed orders of zeros. For low genus these strata have negative Kodaira dimension while for large genus and many zeros they have maximal Kodaira dimension, which follows from the corresponding result about $M_{\{g,n\}}$. We show that also strata with few zeros, e.g. some loci of subcanonical points, have maximal Kodaira dimension for large genus. This is based on recent advances about the compactification of these moduli spaces and an analysis of their singularities.

Klaus Hulek

On the cone of effective surfaces in \bar{A}_3
(joint with Sam Grushevsky)

The nef cone of divisors and, dually, the cone of effective curves in \bar{A}_g (the perfect cone compactification of A_g) is well known due to work of Shepherd-Barron. In this talk I will discuss the cone of effective surfaces in \bar{A}_3 . We produce five surfaces which are extremal effective and conjecture that these surfaces span the pseudo-effective cone.

Don Zagier: Witten spin intersection numbers and the arithmetic of ordinary linear differential equations