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IHP (INSTITUT HENRI POINCARE), Paris, France

Number Theory and Physics

This workshop will take place from the 23rd to the 25th of May. It will survey recent developments at this interface between string theory and number theory.

Organizers :
Miranda Chih-Ning Cheng (Amsterdam University) Amir-Kian Kashani-Poor (LPTENS)
Ruben Minasian (IPhT CEA-Saclay)
David Robert Morrison (UC Santa Barbara)

Speakers :
Sergei Alexandrov (Université de Montpellier)
Kathrin Bringmann (University of Cologne)
Thomas Creutzig (University of Alberta) John Duncan (Emory University)

Terry Gannon (University of Alberta)
Valery Gritsenko (Université Lille and HSE)
Kazuhiro Hikami (Kyushu University)
Shamit Kachru (Stanford University) Jan
Manschot (Trinity College Dublin) Sameer
Murthy (King's College)
Daniel Persson (Chalmers Technological
University)
Vasily Pestun (IHES)
Boris Pioline (Université Paris 6 and CERN)
Oliver Schlotterer (Max Planck Institute for
Gravitational Physics)
Pierre Vanhove (CEA Saclay)
Martin Westerholt-Raum (Chalmers
Technological University)
Don Zagier (Max Planck Insitute Bonn and
ICTP)

Valery Gritsenko, Université Lille and HSE,
Moscow

Title: Kac-Moody algebras, Borcherds
products and L-functions

Abstract:

Recently we found with V. Nikulin a new class of Lorentzian Kac-Moody algebras with complete 2-reflective Weyl groups and 2-reflective automorphic denominator functions. These sporadic algebras, the automorphic corrections of hyperbolic Kac-Moody algebras, reflect one of the the largest symmetry structure of the Universe and appear in different physical models. In this talk, I describe briefly the new 2-reflective class of algebras whose classification is based on the arithmetic theory of hyperbolic lattices, the corresponding Borcherds products and some applications. In particular, I present

1) The main reflective towers of the automorphic Borcherds products of the 2-reflective class which are (new) eigenfunctions of all Hecke operators, i.e. they define automorphic representations of O(2,n);

2) The first example of two very different automorphic corrections of the same hyperbolic Kac-Moody algebra;

3) An infinite series of Siegel cusp forms of weight 3 with Borcherds product constructed by theta-quarks and based on a canonical differential form on a modular Calabi-Yau three-fold (the Barth-Nieto quintic).