



## 25th Seminar Aachen-Köln-Lille-Siegen on Automorphic Forms

Universität Siegen, September 30, 2009

Organizers: K. Bringmann, J. Bruinier, V. Gritsenko, A. Krieg, G. Nebe, N-P. Skoruppa

This is the 25st meeting of the joint French-German intercity seminar on automorphic forms. Everybody who is interested in automorphic forms is welcome. We encourage in particular young researchers to participate and to report on their work in one of our meetings.

When: Wednesday, September 30, 2009

Where: Universität Siegen - Walter-Flex-Strasse 3 - 57068 Siegen  
Emmy-Noether-Campus — Raum D-201

### Schedule

- 14.00 – 15.00 Fredrik Strömberg (Universität Darmstadt):**  
On computational aspects of vector-valued modular forms  
for the Weil representation.
- 15.15 – 16.15 Lassina Dembélé (University of Warwick, UK):**  
Non-solvable Galois number fields ramified at 2, 3 and 5 only.
- Coffee Break
- 17.00 – 18.00 Ulf Kühn (Universität Hamburg):**  
Scattering constants and Neron-Tate heights.
- Dinner



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## Abstract of Talks

**Speaker:** Fredrik Strömberg

**Title:** On computational aspects of vector-valued modular forms for the Weil representation.

**Abstract:** I will discuss computational aspects of the Weil representation associated to the discriminant group of the lattice  $\mathbb{Z}$  together with  $x \mapsto Nx^2$  for an integer  $N \geq 1$  and the associated vector-valued modular forms. In particular I will consider the computation of holomorphic and non-holomorphic Poincaré series.

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**Speaker:** Lassina Dembélé

**Title:** Non-solvable Galois number fields ramified at 2, 3 and 5 only.

**Abstract:** In the mid 90s, the following conjecture was proposed by Dick Gross. Conjecture: For any rational prime  $p \geq 2$ , there exists a non-solvable finite Galois extension  $K/\mathbb{Q}$  which is ramified only at  $p$ . For  $p \geq 11$ , the conjecture follows from work of Serre: he constructs such an extension by using Galois representations attached to mod  $p$  classical modular forms. However, results of Tate and, more recently, Khare and Wintenberger show that for  $p \leq 7$  one cannot obtain such a field extension by using classical modular forms. In this talk, we show that the Gross conjecture is true for  $p = 2, 3$  and  $5$ . We do so by computing spaces of Hilbert modular forms and their associated Galois representations.

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**Speaker:** Ulf Kühn

**Title:** Scattering constants and Neron-Tate heights.

**Abstract:** The constant term in  $s = 1$  of a nonholomorphic Eisenstein series  $E(\tau, s)$  may be seen as a Green function for a cusp. This allows to show that Neron-Tate heights of degree zero divisors on algebraic curves are closely related to scattering constants coming from particular hyperbolic uniformisations of that curves. We explain this relation and illustrate it in an example.