Seminar Aachen-Köln-Lille-Siegen
on Automorphic Forms

Universität zu Köln, March 11, 2015

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

This is the 45th meeting of the joint French-German seminar on automorphic forms
which is organized by the universities of the four cited cities. 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. For further information concerning this
meeting please send an email to kbringma@math.uni-koeln.de or szwegers@uni-koeln.de.

When: Wednesday, March 11, 2015
Where: Universität zu Köln – Weyertal 86 – 50931 Köln – Hörsaal des
              Mathematischen Instituts

Schedule

1.30 pm – 2.30 pm   **Robert Osburn (UCD)**
*Rogers-Ramanujan type identities for
alternating knots*

2.30 pm – 3.30 pm   **Armin Straub (UIUC)**
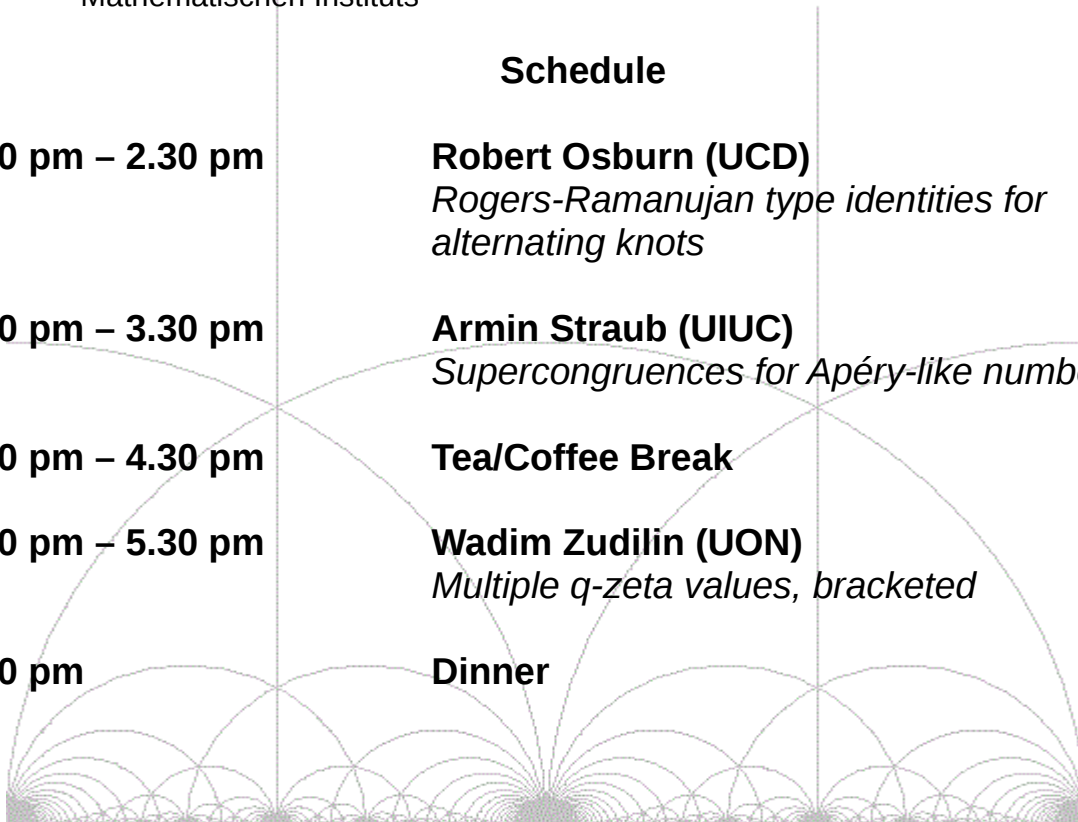*Supercongruences for Apéry-like numbers*

3.30 pm – 4.30 pm   **Tea/Coffee Break**

4.30 pm – 5.30 pm   **Wadim Zudilin (UON)**
Multiple q-zeta values, bracketed

6.00 pm   **Dinner**

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Abstracts

Robert Osburn (UCD): *Rogers-Ramanujan type identities for alternating knots*

Abstract: Two of the most important results in the theory of q-series and partitions are the classical Rogers-Ramanujan identities. There has been considerable interest in the appearance of these and similar identities in various other contexts. In this talk, we highlight the role of q-series techniques in proving identities arising from knot theory. In particular, we prove Rogers-Ramanujan type identities for alternating knots as conjectured by Garoufalidis, Le and Zagier. This is joint work with Adam Keilthy (TCD).

Armin Straub (UIUC): *Supercongruences for Apéry-like numbers*

Abstract: Apéry-like numbers are special integer sequences, going back to Beukers and Zagier, which are modeled after and share many of the properties of the numbers that underly Apéry's proof of the irrationality of $\zeta(3)$. Among their remarkable properties are connections with modular forms and so-called supercongruences of various types, some of which remain conjectural. We discuss these congruences and report on recent generalizations, including a polynomial analog. This talk includes joint work with Robert Osburn and Brundaban Sahu.

Wadim Zudilin (UON): *Multiple q-zeta values, bracketed*

Abstract: The multiple zeta values (MZVs) possess a rich algebraic structure of algebraic relations, which is conjecturally determined by two different (shuffle and stuffle) products of a certain algebra of noncommutative words. This is a graded $\mathbb{Q}$ -algebra and there are several deep conjectures about the dimensions of its subspaces and its ultimate link to the algebra of modular forms. This fact was established for the double zeta values in the work of Gangl, Kaneko and Zagier, where they introduced and studied a version of double Eisenstein series. It is the latter object that was recently generalized by Bachmann to multiple settings, and it finally grew up to a new and surprisingly simple q-analogue of the MZVs, which he called the bi-brackets. The above two products are dual to each other for Bachmann's bi-brackets, in a very natural way. In my talk I plan to overview Bachmann's construction and focus on the following: the radial asymptotics of the bi-brackets, its links to the MZVs, and related linear (in)dependence questions of the q-analogue.