

Departmental Colloquium

Multiple Dirichlet series and moments of L-functions

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Abstract: L-functions — vast generalizations of the Riemann zeta-function — are fundamental objects of study in number theory. In the 1980's the idea emerged that it could be useful to tie together a family of related L-functions in one variable to create a double, or multiple, Dirichlet series, which could be used to study the average behavior of the original family of L-functions. The local structure of these multiple Dirichlet series shows a rich connection to the theory of automorphic forms, and representation theory. On the automorphic side, Whittaker functions on p-adic groups and their covers are the fundamental objects. Whittaker functions and their relatives are expressible in terms of combinatorial structures on the associated L-group, its flag variety, or Schubert varieties. In the combinatorial theory, crystal graphs, Demazure characters, the Schubert calculus and Kazhdan-Lusztig theory all enter.

In this talk, I will focus on the most important case, namely the multiple Dirichlet series associated to moments of L-functions. I will discuss the connection (established recently in joint work with Vicentiu Pasol) between the local parts of these series and the compactifications of certain moduli spaces of curves, and how this information can be combined with the (conjectural in general) analytic continuation of the multiple Dirichlet series to obtain precise asymptotics for moments, for example, of the classical family of quadratic Dirichlet L-functions.

Friday, April 27 at 3:00 PM in SEO 636
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This talk is designed for a general mathematical audience.

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