

SIMION STOILOW INSTITUTE OF MATHEMATICS OF THE ROMANIAN ACADEMY

## IMAR Monthly Lecture

# Moments of quadratic L-functions over function fields

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IMAR, *Miron Nicolescu* amphitheater

**Abstract:** In 2001, Conrey, Farmer, Keating, Rubinstein, and Snaith developed a “recipe” utilizing heuristic arguments to predict the asymptotics of moments of various families of L-functions. This heuristic was later extended by Andrade and Keating to include moments and ratios of the family of L-functions associated to hyperelliptic curves of genus  $g$  over a fixed finite field.

In joint work with Bergström, Petersen, and Westerland, we related the moment conjecture of Andrade and Keating to the problem of understanding the homology of the braid group with symplectic coefficients. We computed the stable homology groups of the braid groups with these coefficients, together with their structure as Galois representations, and showed that the answer matches the number-theoretic predictions. Our results, combined with a recent homological stability theorem of Miller, Patzt, Petersen, and Randal-Williams, imply the conjectured asymptotics for all moments in the function field case, for all large enough odd prime powers  $q$ .