

## The 14th Takagi Lectures

November 15, 2014 (Sat) 14:00–15:00

November 16, 2014 (Sun) 11:20–12:20

Graduate School of Mathematical Sciences

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# Cohomology of Arithmetic Groups and Periods of Automorphic Forms

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## **Abstract**

I will first give a brief introduction to the cohomology of arithmetic groups. I will not assume any prior exposure to the topic, although it will be helpful to be familiar with Hodge theory. I will emphasize one particularly interesting structure: a certain piece of their cohomology looks like the cohomology of a torus.

I will then propose a conjectural explanation for this structure, namely that there is a “hidden” action of certain motivic cohomology groups. I’ll focus on consequences of this conjecture that can be understood without knowing details of motivic cohomology. In particular, the conjecture predicts numerical invariants attached to the cohomology (the “period matrix”), and I will discuss some verifications of these predictions (joint with K. Prasanna). As time permits, I will discuss how the conjecture is related to “derived” Hecke operators.