

Philadelphia Area Number Theory Seminar

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Applications of the Endoscopic Classification to Statistics of Cohomological Automorphic Representations on Unitary Groups

Abstract: Starting from the example of classical modular forms, we motivate and describe the problem of computing statistics of automorphic representations. We then describe how techniques using or built off of the Arthur–Selberg trace formula help in studying it.

Finally, we present recent work on one particular example: consider the family of automorphic representations on some unitary group with fixed (possibly non-tempered) cohomological representation π_0 at infinity and level dividing some finite upper bound. We compute statistics of this family as the level restriction goes to infinity. For unramified unitary groups and a large class of π_0 , we are able to compute the exact leading term for both counts of representations and averages of Satake parameters. We get bounds on our error term similar to previous work by Shin–Templier that studied the case of discrete series at infinity. We also discuss corollaries related to the Sarnak–Xue density conjecture, average Sato–Tate equidistribution in families, and growth of cohomology for towers of locally symmetric spaces. The specific new technique making this unitary example tractable is an extension of an inductive argument that was originally developed by Taïbi to count unramified representations on Sp and SO and used the endoscopic classification of representations (which our case requires for non-quasisplit unitary groups).

This is joint work with Mathilde Gerbelli-Gauthier.

Wednesday, April 5, 2023, 3–5 PM

Bryn Mawr College

Department of Mathematics

Park Science Center **328**

Informal refreshments at 3PM – Talk at 3:30PM