

Abstract

Oberwolfach Workshop:

Automorphic Forms, Geometry and Arithmetic

Dates:

22 Aug - 28 Aug 2021 (Code: 2134)

Organizers:

Gaetan Chenevier, Orsay
Tasho Kaletha, Ann Arbor
Stephen Kudla, Toronto
Sophie Morel, Princeton

This workshop will concentrate on several aspects of the theory of automorphic forms, with an emphasis on the different recent approaches towards the Langlands functoriality principle and the Langlands correspondence, on their *relative* analogues, and on the relations between those advances and more arithmetic questions.

The program initiated by Langlands in the 1960's and 70's envisions a remarkable correspondence between the infinite-dimensional representation theory of reductive groups and the arithmetic of local and global number fields. It provides a promising approach to difficult number theoretic questions by bringing to bear the technical tools of harmonic and functional analysis as well as those of algebraic geometry that are inherent in representation theory of reductive groups.

While the development of this program has been a massive undertaking over the intervening half century, we are at present entering a particularly significant phase in its history. On the one hand, important parts of the theory are now being completed, such as the stabilized Arthur-Selberg trace formula, the classification of automorphic representations of classical groups, description of local Arthur packets, etc. So it is an ideal moment to survey what has been achieved. On the other hand, several exciting new directions are rapidly opening up, for example, new methods for attacking the problem of general functoriality ("beyond endoscopy"), a relative version of Langlands correspondence for spherical varieties, dramatic new results in the function field case, and tantalizing possibilities arising from Scholze's revolutionary ideas in p -adic geometry.

This workshop will focus on the following topics where important recent developments suggest that new progress is now possible.