Department of Mathematics Colloquium

The Internal Structure of the Spaces of Siegel Modular Forms

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Modular forms have emerged as one of the most important tools in modern mathematics. They arise naturally in many areas and are often linked to seemingly unrelated objects in others. They have been used to solve some very deep problems in mathematics, and, increasingly, we are seeing them being linked to problems in Physics too. One of the main reasons modular forms have proved so useful is their rich internal structure, which was revealed to us by Hecke theory.

Siegel modular forms are a generalization, to higher dimensions, of classical modular forms. While Siegel modular forms have huge potential to become as much of an important and indispensable tool as classical modular forms, they haven't been nearly as influential to date. The reason for this is our relative lack of understanding of their internal structure. The seemingly natural generalization of the Hecke theory to higher dimensions doesn't yield the same breadth of results.

In this talk, we will first introduce classical modular forms and the properties that make them so special. We will then describe recent work in proving analogous properties for Siegel modular forms.