

Speaker: Abhinav Kumar

Title: Real multiplication abelian surfaces with everywhere good reduction

Abstract: There are no abelian schemes over $\text{Spec}(\mathbb{Z})$, by a theorem of Fontaine and Abrashkin. On the other hand, there are several examples of elliptic curves over quadratic fields with good reduction everywhere, the first being given by Tate and Serre over the field $\mathbb{Q}(\sqrt{29})$.

I will report on recent joint work with Lassina Dembele, in which we produce several examples of abelian surfaces with real multiplication, defined over a real quadratic field and having good reduction everywhere. It relies on recent explicit equations for Hilbert modular surfaces (due to Elkies and the speaker) and also on efficient computation of Hecke eigenvalues for spaces of Hilbert modular forms (due to Dembele, Donnelly, Voight and Greenberg). Our work also provides some evidence for the Eichler-Shimura conjecture for Hilbert modular forms.

In the latter part of the talk, I will describe how the equations for Hilbert modular surfaces are produced starting from moduli spaces of elliptic K3 surfaces.