Speaker: Liang Xiao

Title: Cycles on Shimura varieties mod p and Tate conjecture

Abstract: I will report on a joint work with Xinwen Zhu on the special fibers of Shimura varieties. We show that, for certain Shimura varieties of Hodge type with hyperspecial level structure at p, the irreducible components of the basic locus of the Shimura varieties mod p generate all Tate classes of its cohomology (under certain genericity condition). This provides many instances of Tate conjecture for motives.

In the pretalk to the graduate students, I will explain the classical result due to Deuring and Serre, describing the supersingular points on a modular curve mod p in terms of a definite quaternion. In the RTG talk, I make explicit our theorem in the case of Hilbert modular surfaces. This case was first proved in the joint work with Yichao Tian. In the main talk, we switch to more general setup, give a description of the basic locus in the language of geometric Satake theory for mixed characteristic groups, and explain the key steps of the proof. If time permits, I will discuss some further examples.