

Topics in Arithmetic Geometry

In this one year course (Spring and Fall, 2002) in arithmetic geometry, we plan to study systematically about Picard modular surfaces, with emphasis on BSD conjecture for CM-abelian varieties, and Andre-Oort conjecture for the density of CM-points. Topics includes:

1. Abelian varieties

- Geometry and moduli

- Arithmetic and L-functions

- Complex multiplications

2. Picard modular surfaces

- Canonical models

- Compactifications

- Jacobians

3. Theta series liftings for $U(3)$

- Weil representations

- Theta series liftings

- L-functions

4. Arithmetic applications

- Special periods of cusp forms and Andre-Oort

- Height pairings of special cycles and BSD

- Equidistributions and p-adic L-functions