

Title: Iwasawa theory, projective modules, and modular representations

Abstract: This talk will be about modules X over a group ring $\mathbb{Z}_p[\Delta]$, where \mathbb{Z}_p denotes the p -adic integers and Δ is a finite group. Such modules occur naturally in Iwasawa theory and sometimes they turn out to be projective modules over $\mathbb{Z}_p[\Delta]$. One can then apply modular representation theory to obtain some interesting and nontrivial relationships between various invariants studied in Iwasawa theory. Our main application concerns an elliptic curve E defined over a number field F . The group Δ will be the Galois group of a finite, Galois extension K of F . The module X and the invariants that we study are related to the Selmer group for E over certain Galois extensions of F containing K .