Pan Asia Number Theory Conference 2016
Institute of Mathematics, Academia Sinica, Taipei, Taiwan
July 11 – 15, 2016

On mod p local-global compatibility for $\mathrm{GL}_3(\mathbb{Q}_p)$ in the non-ordinary case

Chol Park

Korea Institute for Advanced Study
E-mail: **cpark@kias.re.kr**

Abstract

Let $F/\mathbb{Q}$ be a CM field in which p splits completely and $\overline{r} : \mathrm{Gal}(\overline{\mathbb{Q}}/F) \to \mathrm{GL}_3(\overline{\mathbb{F}}_p)$ a continuous modular Galois representation. We assume that $\overline{r}|_{\mathrm{Gal}(\overline{\mathbb{Q}}_p/F_w)}$ is a non-trivial extension of two dimensional irreducible representation by a character at a place w above p. In this talk, we discuss a problem about local-global compatibility in the mod p Langlands program for $\mathrm{GL}_3(\mathbb{Q}_p)$. We define a local invariant associated to $\overline{r}|_{\mathrm{Gal}(\overline{\mathbb{Q}}_p/F_w)}$ in terms of Fontaine-Laffaille theory and provide a nearly optimal weight elimination result as well as the modularity of the obvious weights of $\overline{r}$. We show that the local invariant associated to $\overline{r}|_{\mathrm{Gal}(\overline{\mathbb{Q}}_p/F_w)}$ can be obtained in terms of a refined Hecke action on a space of mod p algebraic automorphic forms on a compact unitary group.

This is a joint work with Daniel Le and Stefano Morra.