

THESIS DEFENCE

Speaker: Ms. Clara Lacroce

Title: Deformations of Galois Representations

Date: Thursday, August 25, 2016

Time: 10:00 a.m.

Location: SGW Campus, LB 921-4

Abstract

In this thesis we study a paper by Barry Mazur ([11]) about deforming Galois representations. In particular we will prove that, if $\bar{\rho} : \Pi \rightarrow \mathrm{GL}_N(k)$ is an absolutely irreducible residual representation, a universal deformation ring $R = R(\Pi, k, \bar{\rho})$ and a universal deformation ρ of $\bar{\rho}$ to R exist. This result is part of the proof of the modularity conjecture.

The modularity conjecture is of great importance since it states a connection between modular forms and elliptic curves over \mathbb{Q} , providing a great tool to study the arithmetic properties of those elliptic curves. Andrew Wiles studied the conjecture as a part of the more general problem of relating two-dimensional Galois representations and modular forms and used [11] to complete his construction.

To better understand the proof of Mazur, we will analyze in detail the paper of Michael Schlessinger ([13]). This article, which is focused on functors over Artin rings, provides a criterion for a functor to be pro-representable. Moreover, it gives the definition of a "hull", which is a weaker property than pro-representability.

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