Geometric Deformations of Orthogonal and Symplectic Galois Representations

Jeremy Booher
University of Arizona

For a representation of the absolute Galois group of the rationals over a finite field of characteristic p, we would like to know if there exists a lift to characteristic zero with nice properties. In particular, we would like it to be geometric in the sense of the Fontaine-Mazur conjecture: ramified at finitely many primes and potentially semistable at p. For two-dimensional representations, Ramakrishna proved that under technical assumptions odd representations admit geometric lifts. We generalize this to higher dimensional orthogonal and symplectic representations. The key ingredient is a smooth local deformation condition obtained by analysing unipotent orbits and their centralizers in the relative situation, not just over fields.