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## Geometry of character varieties via arithmetic techniques

## Abstract

1) General setup: varieties parametrizing n-dimensional representations of the fundamental group of a Riemann surface, moduli space of Higgs bundles on a curve. Weil conjectures, application of arithmetic techniques to obtain geometric information.

2) Tools: Frobenius formula for counting representations, bookkeeping using symmetric functions, generating functions, Macdonald polynomials.

3) Derivation of the main formula for the number of points of the character varieties over finite fields. Connection to quiver varieties. Conjecture for the mixed polynomial.

4) Special cases of the conjecture, geometry and combinatorics. Connection to the Hilbert scheme of points on the affine plane.

Presenter: RODRÍGUEZ VILLEGAS, Fernando (ICTP, Italy)