Motives of character varieties

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Algebraic Geometry can be summarized as the study of geometrical spaces given by the solution sets of polynomial equations. One fundamental aspect when studying such spaces is where these solutions sets live — to give a familiar example, it is fundamentally different to try to solve such an equation over the complex or the real numbers. Many aspects of modern Algebraic Geometry aim at developing tools that simultaneously allow us to see what these spaces have in common and what differentiates them. One such tool is the theory of motives, that was developed to explain some curious common aspects to some equations when they are defined over the complex numbers or finite fields — the so called Weil conjectures. In this talk I will try to make a succinct introduction to this theory, motivating it through these conjectures. Afterwards, I intend to talk about my work on the subject, focusing on the calculations I have done on character varieties — a theory with many applications, both in physics and in mathematics. I will focus on the part of my work that is connected to a famous problem in group theory — the study of pairwise commutative elements in a group.

Invited Algebraic Geometry Session