# On mod $p$ modular forms of weight one

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**Abstract.** According to a conjecture by Serre (1987), absolutely irreducible two dimensional representations of the absolute Galois group of the rationals under which complex conjugation has determinant $-1$ come from mod $p$ modular eigenforms. He also predicts the minimal level, weight and character of the eigenform. In particular, the form should be of weight one if and only if the representation is unramified at $p$.

The mod $p$ modular forms of weight one are quite special. For example, they cannot always be lifted to characteristic zero, and the dimensions of the spaces of such forms are not given by the Riemann-Roch theorem.

The main point of the talk is to explain how to compute the spaces of mod $p$ modular forms weight one and level prime to $p$, equipped with all Hecke operators, in terms of Hecke algebras associated to forms of weight $p$. These Hecke algebras can be computed using modular symbols algorithms.