1003-11-878 Mark Dickinson* (dickinsm@pitt.edu). *The failure of mod-p multiplicity one.* Preliminary report.

Let \( p \) be a prime and \( \rho \) an irreducible two-dimensional mod-\( p \) representation of the absolute Galois group of \( \mathbb{Q} \) that is modular, attached to some classical cuspidal modular form. Then \( \rho \) appears as a subrepresentation of the \( p \)-torsion of the Jacobian \( J_1(N) \) of some modular curve \( X_1(N) \), and this subrepresentation is cut out by a suitable maximal ideal of the ring of Hecke operators acting on \( J_1(N) \). In many cases \( \rho \) appears with multiplicity precisely one; this fact is used in an essential way in the proof of the Shimura-Taniyama conjecture. I’ll discuss some examples where the multiplicity-one condition fails, and their impact on the Taylor-Wiles method. (Received September 30, 2004)