

1044-55-3

**Mark Behrens\*** ([mbehrens@math.mit.edu](mailto:mbehrens@math.mit.edu)), MIT Department of Mathematics, 77 Massachusetts Avenue, Room 2-273, Cambridge, MA 02139. *Congruences amongst modular forms and the stable homotopy groups of spheres.*

I will describe the cohomology theory of topological modular forms (TMF). I will explain how this cohomology theory generates invariants of manifolds and detects elements of the homotopy groups of spheres in terms of modular forms. In particular, arithmetic properties of modular forms give explicit descriptions of periodic families in the stable homotopy groups of spheres. The first part of this talk will be expository, based on the work of Mike Hopkins and his collaborators. The second part will cover elements of my joint work with Tyler Lawson and Gerd Laures. (Received September 01, 2008)