1018-11-71   **Jordan S Ellenberg*** (`ellenber@math.wisc.edu`) and **Akshay Venkatesh**. *Reflection principles and l-parts of class groups.*

(joint work with A. Venkatesh) We know much more about the sizes of ideal class groups than about the structures of the groups themselves; in particular, if $Cl_K[l]$ is the l-torsion subgroup of the class group of a number field K, then we typically know very little about how large $|Cl_K[l]|$ can be beyond the trivial bound that the l-torsion subgroup is smaller than the whole group! Bounds on l-torsion subgroups of class groups have appeared in various contexts of arithmetic enumeration, including counting elliptic curves of conductor N and counting number fields. Recent results of Pierce and Helfgott-Silverman (unconditional) and Soundararajan and S. Wong (conditional) have broken the trivial bound barrier in some cases; we present a new result which essentially makes Soundararajan's result unconditional in many cases (including that of 3-torsion in class groups of quadratic fields) by means of the Arakelov class group and a trick involving reflection principles. (Received February 26, 2006)