Meeting: 1003, Atlanta, Georgia, SS 8A, AMS Special Session on Modular Representation Theory of Finite and Algebraic Groups, I

1003-20-528 **Robert M. Guralnick** (guralnic@math.usc.edu), Department of Mathematics, University of Southern California, Los Angeles, CA 90089-1113, and **Pham Huu Tiep*** (tiep@math.ufl.edu), Department of Mathematics, University of Florida, Gainesville, FL 32611-8105. *The non-coprime $k(GV)$-problem.* Preliminary report.

Let H be a finite group with a normal, self-centralizing, elementary abelian p-subgroup V, and let $k(H)$ denote the number of conjugacy classes of H. Can one characterize all H such that $k(H) > |V|$? The classical $k(GV)$-problem (solved very recently) addresses the case where p is coprime to $|V|$, and the interest in it is motivated by its connection to the $k(B)$-conjecture of R. Brauer. We consider the general case where p may divide $|V|$ – it is related to a recent conjecture of G. R. Robinson that bounds the numbers and heights of characters in p-constrained groups, and some other applications as well. Assuming $G := H/V$ is almost quasisimple and $O_p(G) = 1$, we show that either

(i) $k(H) < |V|/2$, or

(ii) G belongs to an explicit list of "small" groups, and every composition factor W of the G-module V has $|W|$ bounded in terms of G, or

(iii) G is a finite classical group in characteristic p, and every composition factor of the G-module V is quasi-equivalent to the natural module of G. (Received September 21, 2004)