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Christopher P Bendel, Daniel K Nakano and Cornelius Pillen*

(pillen@jaguar1.usouthal.edu), Department of Mathematics and Statistics, University of South Alabama, Mobile, AL 36688. *Vanishing ranges for the cohomology of finite groups of Lie type*. Preliminary report.

Let G be a simple algebraic group over a field k of prime characteristic p which is split over the prime field \mathbb{F}_p , and $\text{Fr} : G \rightarrow G$ denote the Frobenius map. The fixed points of the r th iterate of the Frobenius map, denoted $G(\mathbb{F}_{p^r})$, is a finite Chevalley group. A long standing elusive open problem is to determine the cohomology ring $H^\bullet(G(\mathbb{F}_{p^r}), k)$. In general one does not even know in which degree the first non-trivial cohomology class occurs. In this talk we investigate two problems:

1. Determining Vanishing Ranges: Finding $D > 0$ such that the cohomology group $H^i(G(\mathbb{F}_{p^r}), k) = 0$ for $0 \leq i \leq D$.
2. Locating the First Non-Trivial Cohomology Class: In many instances we will find a D such that $H^i(G(\mathbb{F}_{p^r}), k) = 0$ for $0 < i \leq D$ and $H^{D+1}(G(\mathbb{F}_{p^r}), k) \neq 0$. (Received February 03, 2009)