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Cornelius Pillen* (pillen@jaguar1.usouthal.edu), Department of Mathematics and Statistics, University of South Alabama, Mobile, AL 36688. *Cohomology of Finite Groups of Lie Type and Kostant's Partition Functions*. Preliminary report.

Let G be a simple algebraic group over an algebraically closed field k of prime characteristic $p > 0$ which is split over the prime field \mathbb{F}_p . Let $\text{Fr} : G \rightarrow G$ denote the Frobenius map and set $q = p^r$. The fixed points of the r th iterate of the Frobenius map, denoted $G(\mathbb{F}_q)$, is a finite Chevalley group. In this talk we will study the cohomology groups $H^i(G(\mathbb{F}_q), k)$ as well as $H^i(G(\mathbb{F}_q), V)$, for certain irreducible modules V . By using techniques involving line bundle cohomology for the flag variety G/B , here B denotes a Borel subgroup of G , we are able to find relations with combinatorial data coming from Kostant's partition functions. This is joint work with Chris Bendel and Dan Nakano. (Received September 20, 2010)