Meeting: 1005, Newark, Delaware, SS 5A, Special Session on Designs, Codes, and Geometries

1005-51-27 **G Eric Moorhouse*** (moorhous@uwyo.edu), Department of Mathematics, 1000 E University Ave., Dept. 3036, University of Wyoming, Laramie, WY 82071. *Some new algebraic approaches to nets and planes.* Preliminary report.

The two main open questions in the study of finite projective planes are (1) must every plane have prime power order? and (2) must every plane of prime order be Desarguesian? These questions have been reduced to a more general conjecture on p-ranks of nets. In this talk we will describe two new and reasonable approaches to this conjecture. One such approach is inspired by techniques which successfully answer the analogous questions concerning ranks of webs, over the real and complex fields, but also as we explain, over the field $F((X))$ where F is a field of prime order. The second approach uses exponential sums. (Received January 12, 2005)