1154-11-219 **Kelly Isham*** (`ishamk@uci.edu`), **Nathan Kaplan** and **Max Weinreich**. *Counting n-arcs in projective planes.*

An n-arc in $\mathbb{P}^2(\mathbb{F}_q)$ is a collection of n distinct points such that no three lie on a line. In 1988, Glynn gave an algorithm for counting the number of n-arcs in a projective plane of order q. He found that for $n \leq 6$, the formula for the number of n-arcs is polynomial in q and that for $n = 7$ and 8, the formula is quasipolynomial in q. In 1995, Iampolskaia et al showed that the formula for $n = 9$ is also quasipolynomial. Recent work by Kaplan et al extended this result to arbitrary projective planes of order q. This leads to the question - will the number of n-arcs over $\mathbb{P}^2(\mathbb{F}_q)$ continue to be quasipolynomial in q? In this talk, we discuss a modification of Glynn's algorithm that makes computation simpler and we explain how the problem of counting the number of n-arcs in the projective plane over $\mathbb{F}_q$ is equivalent to counting the number of rational points on certain varieties over $\mathbb{F}_q$. We use this new approach to prove that the number of 10-arcs in a projective plane over $\mathbb{F}_q$ is not quasipolynomial. Lastly, we discuss analagous results for larger n and we relate this counting problem to the study of $\mathbb{F}_q$-points on Grassmannians and to MDS codes. (Received September 16, 2019)