1086-11-923 **Enrique Treviño*** (etrevin1@swarthmore.edu), 500 College Avenue, Swarthmore College, Swarthmore, PA 19081. *The Burgess inequality and the least k-th power non-residue.*

The Burgess inequality is the best upper bound we have for the character sum $S_\chi(M,N) = \sum_{M<n\le M+N} \chi(n)$. Until recently, no explicit estimates had been given for the inequality. In 2006, Booker gave an explicit estimate for quadratic characters which he used to calculate the class number of a 32-digit discriminant. McGown used an explicit estimate to show that there are no norm-Euclidean Galois cubic fields with conductor greater than 10^{70}. Both of their explicit estimates are on restricted ranges. In this talk we give an explicit estimate that works for any integers M and N. We also improve McGown's estimates in a slightly narrower range, getting explicit estimates for characters of any order. We apply the estimates to the question of how large must a prime p be to ensure that there is a k-th power nonresidue less than $p^{1/6}$. (Received September 24, 2012)