Abstract:

In this talk we discuss various kinds of Kloosterman sums (or integrals). The identities can be viewed as a vast generalization of the following classical identity. Let $k$ be a finite field, $k'$ its quadratic extension, $\psi : k \rightarrow \mathbb{C}^\times$ a non trivial character. Then, for $c \in k^\times$,

$$\sum_{x_1, x_2 \in k \atop x_1 x_2 = c} \psi(x_1 + x_2) = - \sum_{x \in k' \atop \bar{x} x = c} \psi(x + \bar{x}).$$

The identities can be used to investigate integrals of automorphic forms over certain subgroups. In turn, these integrals are related to special values of $L$-functions.