

Exponential sums and additive combinatorics

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The work of Bourgain-Katz-Tao on the sum-product estimates in prime fields has found many important applications in various areas. In particular, an application of their result solves a difficult exponential sum problem in analytic number theory. The goal of this talk is to introduce the connection between analytic number theory and additive combinatorics, and present our recent results that give nontrivial upper bounds for some certain exponential sums in prime fields.