

COMBINATORICS  
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*Diophantine tuples over integers and finite fields*

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**Abstract:** A set  $\{a_1, a_2, \dots, a_m\}$  of distinct positive integers is a Diophantine  $m$ -tuple if the product of any two distinct elements in the set is one less than a square. There is a long history and extensive literature on the study of Diophantine tuples and their generalizations in various settings. In this talk, we focus on the following generalization: for each  $n \geq 1$  and  $k \geq 2$ , we call a set of positive integers a Diophantine tuple with property  $D_k(n)$  if the product of any two distinct elements is  $n$  less than a  $k$ -th power, and we denote  $M_k(n)$  be the largest size of a Diophantine tuple with property  $D_k(n)$ . In this talk, I will present improved upper bounds on  $M_k(n)$ . I will also discuss the analogue of Diophantine tuples over finite fields, which is of independent interest. Joint work with Seoyoung Kim and Semin Yoo.

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