

## Princeton Discrete Math Seminar

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Thursday, October 25th

Department of Mathematics

2:15-3:15pm

Fine Hall, Room 224

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### Sum-product estimate via expanders

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Let  $F_q$  be a finite field of order  $q$  and  $P(x, y)$  be a polynomial in  $F_q[x, y]$ . For a subset  $A$  of  $F_q$ , define  $P(A) = \{P(x, y) \mid x, y \in A\}$ . Using certain construction of expanders, we characterize all  $P$  for which the following phenomenon holds:

*If  $|A + A|$  is small, then  $|P(A)|$  is large.*

The case  $P = xy$  corresponds to sum-product problems.