

## On the typical structure of sets with small sumset

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Freiman's theorem tells us that any integer set  $A$  with bounded doubling constant  $K$  is contained in a multidimensional arithmetic progression of size and dimension only depending on  $K$ , but can something stronger be said about almost all such sets? A recent result of Campos shows that yes, with high probability, a random set  $A$  of integers in the interval  $[0, N]$  chosen among subsets with given cardinality  $s$  and doubling constant  $K$  is almost contained in a short arithmetic progression of size  $Ks/2$ . Surprisingly, this result holds even outside the case of bounded doubling, as  $K$  is allowed to be of the order  $s/\log(n)^3$ . We extend this result to pairs of distinct sets whose cardinalities are not too far apart. The main tool used in the proof is an extension of the asymmetric container lemma recently introduced by Morris, Samotij and Saxton to multipartite hypergraphs.

Joint work with Marcelo Campos, Matthew Coulson and Oriol Serra.