

# CONSTRUCTIONS OF LARGE PROGRESSION-FREE SETS, CAPS AND RELATED STRUCTURES

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The construction of large sets without arithmetic progressions in various settings is a classical topic in geometry and more recently also in additive combinatorics. In this talk, we first give an overview of some classical results in this field and then present very recent progress for progression-free sets in  $\mathbb{Z}_m^n$ , which is based on a method introduced by Elsholtz and Pach in 2020. Moreover, we also discuss an extension of their approach which leads to exponentially improved lower bounds for the size of affine caps – subsets of  $\mathbb{Z}_m^n$  without three points on a line. Finally, we show a connection to the construction of linear codes.

This is joint work with Christian Elsholtz and Benjamin Klahn.

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