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Modelling in additive combinatorics

Consider a subset A of the first n integers. By work of Sanders and Croot, Laba, Sisask, we know that if A has density at least $(\log n)^{-1+\varepsilon}$, then A contains a three-term arithmetic progression, and $A + A$ contains a 'long' three-term arithmetic progression. In this talk, we consider generalizations of these two statements to the case where A is a finite subset of an arbitrary abelian group, subject only to a condition of small doubling. The method we use is a refinement of the original modelling technique of Ruzsa, using recent developments on the polynomial Freiman-Ruzsa conjecture.