Hilbert cubes in arithmetic sets

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The talk is based on the joint work with Christian Elsholtz, and joint work with Christian Elsholtz and Igor Shparlinski

Session: 1. Analytic Number Theory

A Hilbert cube is an iterated sumset of the form $a_0+\{0,a_1\}+\cdots+\{0,a_d\}$. In this talk we discuss how large the dimension d of a Hilbert cube in "interesting" arithmetic sets such as squares at most N, squarefull numbers at most N or pure powers at most N can be. We also briefly address the related problem of bounding the dimension of Hilbert cubes in quadratic residues modulo a prime. The proofs of our results combine combinatorial methods as well as Diophantine results, bounds for character sums and an application of the larger sieve.