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Recent developments in the discrete Fuglede conjecture

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(joint work with GERGELY KISS, GÁBOR SOMLAI and MÁTÉ VIZER)

Fuglede's conjecture was stated in 1974, and connects an analytic with a geometric property of a given bounded measurable subset $T \subset \mathbb{R}^d$. In particular, it states that T accepts a complete orthogonal basis of exponential functions if and only if it tiles \mathbb{R}^d by translations. This conjecture has been largely disproved, originally by Tao in 2004, and then by Farkas, Kolountzakis, Matolcsi, Móra and Révész for $d \geq 3$. This has been achieved by lifting counterexamples of Fuglede's conjecture in finite Abelian groups to counterexamples in Euclidean spaces. Since then, the characterization of finite Abelian groups satisfying (the discrete version of) Fuglede's conjecture has developed an interest for its own sake. We will present the recent results pertaining to this problem, including those of the speaker, along with Kiss, Somlai, Vizer.