

# HARMONIC AND SPECTRAL ANALYSIS

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## Fuglede's conjecture in elementary abelian groups

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Fuglede's conjecture, dating back to 1974, roughly states that tiling sets and spectral sets in  $\mathbb{R}^d$  are one and the same. This conjecture has been extended to arbitrary abelian groups, motivated by the fact that the counterexample in  $\mathbb{R}^5$  found by Tao originates from a counterexample in the abelian group  $(\mathbb{Z}/3\mathbb{Z})^5$ . It is in this setting we will focus on.

We will discuss Fuglede's conjecture in the elementary abelian groups  $(\mathbb{Z}/p\mathbb{Z})^d$  from a geometrical perspective, review its current state, and consider related conjectures in finite geometry which might be unknown, yet interesting, to researchers in harmonic analysis.