

# HARMONIC AND SPECTRAL ANALYSIS

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## Finite variations on the Steinhaus tiling problem

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This is a talk about an object tiling simultaneously with many different groups. The original Steinhaus Tiling Problem asks for a subset of the plane that tiles with all rotations of  $\mathbb{Z}^2$ . One variation of this is to ask for a set that tiles with finitely many rotations. Another is to ask for a function (not necessarily an indicator function) that can tile with many (or all) rotations of  $\mathbb{Z}^2$ . Can such a function have bounded support? If yes, how large must the diameter be? How large must the area of the support be? What if one tries to tile an abelian group  $G$ ? If  $G_1, G_2$  are subgroups of  $G$  can one find a subset of  $G$  that tiles when translated by  $G_1$  and also when translated by  $G_2$ ? If we cannot find a set can we find a function then? How “large” must the support of this function be in this case? We will show some results, some old and some new, and many more questions.