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The structure of translational tilings

Abstract:

Translational tiling is a covering of a space (e.g., Euclidean space) using translated copies of a building block, called a "tile", without any positive measure overlaps. What are the possible ways that a space can be tiled? One of the most well known conjectures in this area is the periodic tiling conjecture. It asserts that any tile of Euclidean space can tile the space periodically. This conjecture was posed 35 years ago and has been intensively studied over the years. In a joint work with Terence Tao, we disprove the periodic tiling conjecture in high dimensions. In the talk, I will motivate this result and discuss our proof.