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Local Theory in Tilings and Delone Sets

Local detection of global properties in a geometric structure is usually a challenging problem. The Local Theorem for Tilings says that a tiling of Euclidean d-space is tile-transitive (isohedral) if and only if the large enough neighborhoods of tiles (coronas) satisfy certain conditions. This is closely related to the Local Theorem for Delone Sets, which locally characterizes those point sets among the uniformly discrete point sets in d-space which are orbits under a crystallographic group. Both results are of great interest in crystallography. We discuss old and new results from the local theory of tilings and Delone sets.