Tilings with unique vertex corona.

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Abstract

The well-known Local Theorem by N. Dolbilin establishes local conditions on tile neighbourhoods of a tiling $\mathcal{T}$ that are necessary and sufficient for $\mathcal{T}$ being crystallographic.

Theorem 1 (N. Dolbilin)**.** *A tiling $\mathcal{T}$ in d-dimensional Euclidean of hyperbolic space is crystallogrpaphic iff the following two conditions hold for some $k \geq 0$:*

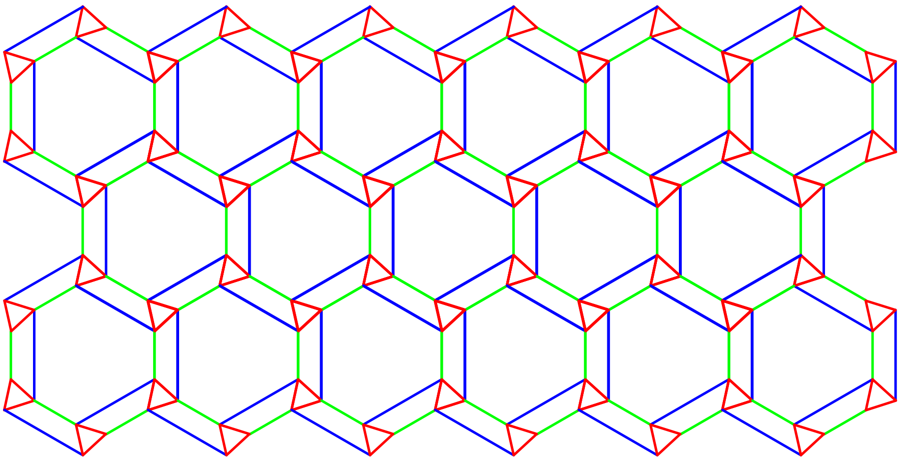
(1) *For the numbers $N(k)$ of k-coronae (i.e. union of all tiles in the k-th surrounding of a given tile) holds: $N(k+1) = N(k)$, and $N(k)$ is finite.*

(2) *$S_i(k+1) = S_i(k)$ for $1 \leq i \leq N(k)$,*

where $S_i(k)$ denotes the symmetry group of the i-th k-corona.

The question arises whether there are local conditions on the vertex neighbourhoods that imply that the tiling is crystallographic. In particular, if all vertex coronas are congruent, is the tiling necessarily crystallographic?

In this talk we will present several possible families of tilings with unique vertex corona and post discuss which translation group such a tiling can have.



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