**MS026.O02**

*Vertex-transitive monocoronal tilings from isohedral tilings*

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In this work, we present a class of Euclidean and hyperbolic tilings known as monocoronal tilings. A monocoronal tiling is where all its vertex-coronae are congruent. By a vertex-corona of a vertex of a tiling, we mean its vertex together with the tiles incident to it.

Vertex-transitive Euclidean monocoronal tilings are of importance in crystallography because as graphs they are considered to be uninodal "nets" and are useful in describing the structure of crystals [1, 2]. Moreover, studies on particular hyperbolic monocoronal tilings show projections of these tilings to three-periodic minimal surfaces in $E^3$ to obtain crystalline three periodic nets [3]. In the hope of providing a wider range of tilings which could be used in describing and studying crystalline nets, we provide an approach of generating vertex-transitive monocoronal tilings.

In this presentation we discuss our methodology in constructing vertex-transitive monocoronal tilings from face-to-face isohedral tilings T. The method requires considering the orbit $Hx = \{hx : h \in H\}$ of a point x (in the interior of tile t in T) under a particular subgroup H of the symmetry group of T. To form a monocoronal tiling, we connect by an edge two points in Hx that belong to adjacent tiles in T. Such a method provides a systematic enumeration of vertex-transitive monocoronal tilings.

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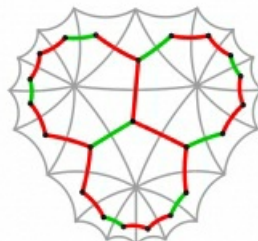
Vertex-corona of a monocoronal tiling from isohedral tiling [9³]
where edges of the same color represent congruent edges.

**Keywords:** monocoronal tilings, hyperbolic tilings, crystalline nets