

Tiling of the Sphere by Congruent Curvilinear Polygons

Min Yan

Hong Kong University of Science and Technology

mamyan@ust.hk

The study of tilings of the sphere by congruent polygons has a long history. In an edge-to-edge tiling of the sphere by congruent polygons, the polygon is triangle, quadrilateral or pentagon. The classification of triangular tilings was started by Sommerville exactly a century ago, and was finally completed by Ueno and Agaoka 20 years ago. After 10 years work, we completed the classifications of quadrilateral and pentagonal tilings.

We are currently working on various subsequent research directions. In this talk, I will concentrate on tilings by congruent polygons, such that the edges are not necessarily straight. We call such polygons *curvilinear*. Moreover, we consider all surfaces, not just the sphere. As initial exploration of such tilings, I discuss two extreme aspects of curvilinear tilings.

The first is the crucial role played by the non-symmetry of the edges. In the most general case, the tilings are actually quite rigid, and the classification of tilings can be interpreted as finding certain subgroups of finite index.

The second is curvilinear sphere tilings. I will present the full classification of curvilinear triangular tilings of the sphere.