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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

MATHEMATICS COLLOQUIUM

Edge-to-Edge Tilings of the Sphere by Congruent Polygons

By

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Abstract

The history of sphere tiling can be traced to as early as Plato and Archimedes. The central problem is to classify tilings of the sphere by various types of polygons. Here by classification, we mean not only all the possible tiles, but also all the ways the tiles are fit together in the sphere.

There are two very recent breakthroughs. The first is the complete classification of tilings of the sphere by regular polygons. The second is the complete classification of edge-to-edge tilings of the sphere by congruent polygons.

In the second problem, the polygon must be triangle, quadrilateral, or pentagon. The classification of triangular tilings was started by Sommerville exactly a century ago, and was completed by Ueno and Agaoka in 2002. In 2013, Gao, Shi and Yan classified edge-to-edge tilings of the sphere by 12 pentagons, which was the first classification beyond triangular tilings. Now we have completed the whole classification, i.e., quadrilateral and pentagonal tilings. The tilings are generally of two types: Platonic type and earth map type. There are also several sporadic quadrilateral tilings.

Date : 2 February 2024 (Fri)
Time : 3:00pm – 4:00pm
Venue : Lecture Theater F (Lifts 25/26)

All Are Welcome!