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Thomas Hales* (hales@pitt.edu), 416 Thackeray Hall, Math Department, University of Pittsburgh, Pittsburgh, PA 15260, and **Wöden Kusner**. *Packings of Regular Pentagons in the Plane*.

We determine a densest packing of congruent regular pentagons in the plane. More specifically, we prove the pentagonal ice-ray conjecture of Henley (1986), and Kuperberg and Kuperberg (1990), which asserts that an optimal packing of congruent regular pentagons in the plane is a double lattice, formed by aligned vertical columns of upward pointing pentagons alternating with aligned vertical columns of downward pointing pentagons.

This talk will go into some of the history of the packings of regular pentagons, including a packing described by Albrecht Dürer in 1525, the pentagonal ice-ray that appears in Chinese lattice design around 1900, and developments starting with Penrose tilings and quasi-crystals. Some of the main ideas of our computer-assisted proof will be described, including the use of a meet-in-the-middle algorithm, inspired from cryptography.

The preprint is on the arXiv (same title). (Received September 13, 2016)