A tiling paradox

Peter Horák

Tiling problems belong to the oldest problems in mathematics. They attracted attention of many famous mathematicians. Even one of the Hilbert's problems is devoted to the topic. The interest in tilings by unit cubes originated with a conjecture raised by Minkowski in 1907.

We discuss this conjecture, its history and variations, and then we describe some problems that Minkowski's conjecture, in turn, suggested. We will focus on tilings of $\mathbb{R}^n$ by the n-cross; a cluster of $2n + 1$ unit cubes comprising a cube and its reflections in all faces. Some "unexpected" tilings by n-crosses will be presented.