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Maximally dense sphere packings

It is well known that to cover the greatest proportion of the Euclidean plane with identical disks, we have to center these disks in a triangular grid. This problem can be generalized in two directions: in higher dimensions or with different sizes of disks. The first direction has been the most studied (for example, in dimension 3, the Kepler's conjecture was proved by Hales and Ferguson in 1998). In this talk, we will rather focus on the second direction, in particular on the cases of two or three disc sizes. We will survey recent results for a large audience.