

Charles Holton

Symmetry in packing problems and tiling systems

Abstract: The objects of our study are the optimally dense packings of Euclidean or hyperbolic space by congruent copies of bodies from some fixed finite set. Our approach is to consider the space of packings with the action of the group of rigid motions as a dynamical system. We use ergodic theory to give a new formalism for densest packing problems, and this yields a short proof that optimally dense packings exist. Very few optimum density problems have been solved, and the second half of the talk focuses on tilings as a special class of densest packings that we can get our hands on. We address the question of which structural properties of tiling systems are preserved by topological conjugacy. The word “symmetry” will be abused.

This is joint work with L. Bowen, C. Radin, and L. Sadun.