

1024-00-28

Joshua E. S. Socolar* (socolar@phy.duke.edu), Physics Department, Duke University,
Durham, NC 27708. *Hexagonal parquet tilings and k -isohedral monotiles*. Preliminary report.

A k -isohedral monotile is a single, simply connected tile that can fill space without overlaps, but only in a pattern containing at least k tiles that are not related by any operation that leaves the full tiling invariant. A construction has been found for a three-dimensional k -isohedral monotile with arbitrarily large k . This example is based on the two-dimensional hexagonal parquet tiling in which each tile is a parallelogram. If (and only if) one relaxes the definition to allow either coloring of tile edges, a multiply connected monotile, or a density maximization rule rather than space filling, the two-dimensional hexagonal parquet tiling can also be forced. These results highlight important subtleties in the relationship between local constraints and global structure. (Received November 29, 2006)