

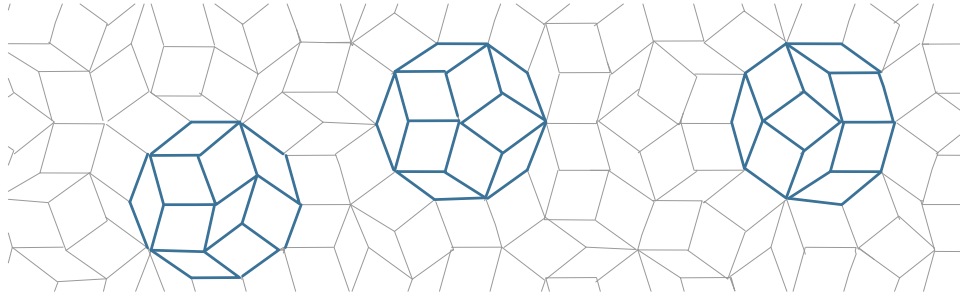
A proposal for

A Penrose Tiling for the Simons Center Plaza-level Floor

Tony Phillips, October 2009

The Penrose Tiling

The Penrose tiling in its most elegant form is the projection onto the plane of a surface in 5-dimensional space. This surface is made up of squares parallel to the coordinate planes, with adjoining squares perpendicular to each other (all this in 5-space). There are 10 possible orientations for such a square, and in our projection these give two tile shapes, with 5 possible orientations for each of them. The shapes are rhombi (parallelograms), a “fat” rhombus with angles 108° and 72° , a “thin” rhombus with angles 144° and 36° .



In the surface in 5-space, whenever a vertex meets exactly three squares, these must be relatively positioned like three faces of a cube. When the three are projected into the plane, they look like the isometric perspective image of an ordinary 3-dimensional cube. But this interpretation cannot be extended to neighboring tiles. Even though those may be part of another cube, the cubes, interpreted in 3-space, would form an “impossible” configuration. Some instances of this phenomenon, which forces our perception of the the tiling to continually shift from one interpretation to another, are highlighted in blue in the figure above.

The next page shows a proposed Penrose tiling of the Plaza-level floor in the Simons Center for Geometry and Physics. The tile size chosen here is arbitrary, but it would be desirable for the tiles to be large enough for the perspective effect to be enjoyed by spectators looking down from the gallery.

Please note that this is not an authentic Penrose tiling, but has been cobbled together from two large pieces, with some extra bits along the edges, for the purposes of this proposal. A real Penrose tiling never repeats itself exactly.

