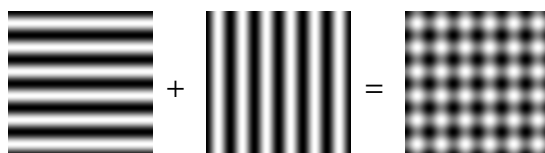


Quasicrystals

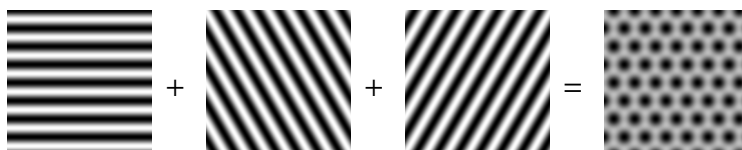
A five-fold quasicrystalline geometry underlies these ornaments. Quasicrystals are full of emergent, fractal patterns, but are simple to describe. A crystal is a structure that repeats. A quasicrystal is a structure that *almost* repeats. Two dimensional quasicrystals can be built by superimposing simple patterns of stripes. Lets start with a one dimensional crystal. This is a repeating pattern of stripes:



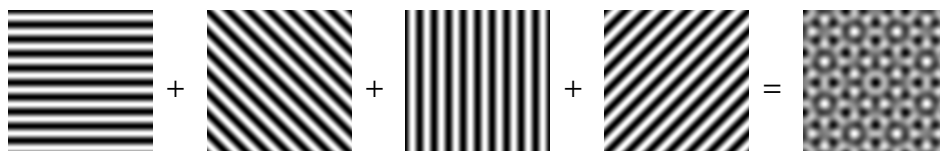
Two waves, at right angles, makes a checkerboard:



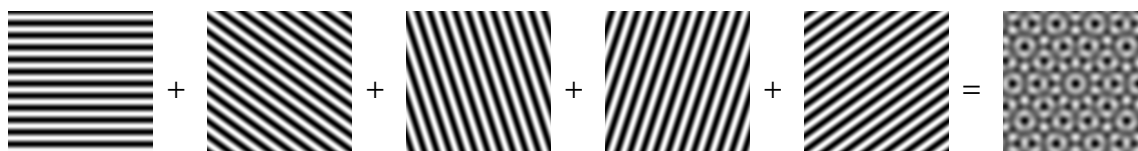
Three waves, equally spaced in three different directions, makes a repeating honeycomb:



Something interesting happens when we go to four waves though: the waves no longer overlap in a simple, repeating pattern:



These designs are based on the five-fold two dimensional quasicrystal:



Three dimensional quasicrystals are also possible, but are more complicated. They can be thought of as slices through higher-dimensional crystals. Many metal alloys naturally form quasicrystals, and the discovery of natural quasicrystals was the subject of the 2011 Nobel prize in chemistry.