

Higher Dimensional Quasicrystals from Hyperbolic Honeycombs

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I will describe a higher-dimensional version of the AdS/qCFT construction that assigns a d -dimensional quasicrystal to the boundary of a $(d+1)$ -dimensional hyperbolic lattice. I will start by refining the familiar $1d/2d$ construction by "half-step substitution rules," which relate dual $\{p,q\}$ and $\{q,p\}$ tilings and make the local invertible structure more apparent. With this refinement, I will briefly describe bulk reconstruction from boundary data and give a more complete definition of the associated boundary quasicrystal by "holographic foliations" (a hyperbolic generalization of de Bruijn's inflation/deflation definition). Finally, I will explain the generalization of this procedure to higher-dimensional lattices and quasicrystals, focusing on the icosahedral $\{3,5,3\}$ honeycomb for concreteness, and comment on a conjecture of Bill Thurston.