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Fusion: a general framework for hierarchical tilings

We introduce a formalism for handling general spaces of hierarchical tilings, a category that includes substitution tilings, Bratteli-Vershik systems, S -adic transformations, and multi-dimensional cut-and-stack transformations. We explore ergodic, spectral and topological properties of these spaces. Familiar properties of substitution tilings carry over under appropriate assumptions, but can fail where these assumptions are not met. For instance, there is a 2-dimensional tiling space that has pure point measure-theoretic spectrum but is topologically weakly mixing. This is joint work with Lorenzo Sadun of the University of Texas at Austin.