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Expansions in bases 2 and 3: old conjectures and new results

In the 1960s, H. Furstenberg proposed a series of conjectures that, in different ways, aim to capture the heuristic principle that "expansions in bases 2 and 3 have no common structure". Some of these conjectures remain wide open, but several have been solved in the last few years. In the talk I will survey several of the conjectures, and then focus on Furstenberg's conjecture on intersections of Cantor sets, which has been recently settled independently by Meng Wu and by myself (with two strikingly different proofs). I will aim to make the talk accessible to a general audience of mathematicians; some basic concepts in ergodic theory and fractal geometry will be introduced along the way.