Critical Dimension and entropy in dynamical systems

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A measurable dynamical system is a measure space $(X, \mathcal{B}, \mu)$ equipped with an invertible transformation T such that both T and its inverse are measurable. Whilst many people work on the measure-preserving case, this talk is about the non-singular case, where $\mu \circ T \sim T$. These are the Type III systems in von Neumann's classification.

In joint work with Hamachi, we showed that they are all orbit equivalent to Bratelli-Vershik systems (ie a reasonably straightforward graphical representation) equipped with Markov transitions to define the measure.

Further, we have recently developed a notion called Critical Dimension which controls how quickly sums of the Radon-Nikodym derivatives grow, and this leads to a new classification of these systems, and has curious connections with entropy.