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Topological orbit equivalence of free, minimal actions of $\mathbb{Z}^d$ on the Cantor set

In 1959, H. Dye introduced the notion of orbit equivalence and proved that any two ergodic finite measure-preserving transformations on a Lebesgue space are orbit equivalent. He also conjectured that an arbitrary action of a discrete amenable group is orbit equivalent to a $\mathbb{Z}$-action. This conjecture was proved by Ornstein and Weiss and its most general case by Connes, Feldman and Weiss by establishing that an amenable non-singular countable equivalence relation R can be generated by a single transformation, or equivalently is hyperfinite, i.e., R is up to a null set, a countable increasing union of finite equivalence relations.

In the Borel case, Weiss proved that actions of $\mathbb{Z}^d$ are (orbit equivalent to) hyperfinite Borel equivalence relations, whose classification was obtained by Dougherty, Jackson and Kechris. In 1995, Giordano, Putnam and Skau proved that minimal $\mathbb{Z}$-actions on the Cantor set were orbit equivalent to approximately finite (AF) relations and their classification was given.

In this talk I will indicate the main steps of the proof of the general result obtained in a joint effort with H. Matui, I. Putnam and C. Skau and whose statement is the following:

Theorem *Any minimal, free $\mathbb{Z}^d$-action on the Cantor set is affable (i.e., orbit equivalent to AF-relations).*