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Constructions in minimal amenable dynamics and applications to classification of C^ -algebras.*

What abelian groups can arise as the K -theory of C^* -algebras arising from minimal dynamical systems? In joint work with Robin Deeley and Ian Putnam, we completely characterize the K -theory of the crossed product of a space X with finitely generated K -theory by an action of the integers and show that crossed products by a minimal homeomorphisms exhaust the range of these possible K -theories. We also investigate the K -theory and the Elliott invariants of orbit-breaking algebras. We show that given arbitrary countable abelian groups G_0 and G_1 and any Choquet simplex Δ with finitely many extreme points, we can find a minimal orbit-breaking relation such that the associated C^* -algebra has K -theory given by this pair of groups and tracial state space affinely homeomorphic to Δ . These results have important applications to the Elliott classification program for C^* -algebras. In particular, we make a step towards determining the range of the Elliott invariant of the C^* -algebras associated to étale equivalence relations.