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Fundamental group of uniquely ergodic Cantor minimal systems

We introduce the fundamental group $\mathcal{F}(\mathcal{R}_{G,\varphi})$ of a uniquely ergodic Cantor minimal G -system $\mathcal{R}_{G,\varphi}$ where G is a countable discrete group. We compute fundamental groups of several uniquely ergodic Cantor minimal G -systems and show that if $\mathcal{R}_{G,\varphi}$ arises from a free action φ of a finitely generated abelian group, then there exists a unital countable subring R of \mathbb{R} such that $\mathcal{F}(\mathcal{R}_{G,\varphi}) = R_+^\times$. Therefore $\{4^n : n \in \mathbb{Z}\}$ cannot be realized as the fundamental group of a Cantor minimal system in this class. Furthermore we consider the relation between fundamental groups of uniquely ergodic Cantor minimal \mathbb{Z}^n -systems and fundamental groups of crossed product C^* -algebras $C(X) \rtimes_\varphi \mathbb{Z}^n$.