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Borel complexity and automorphisms of operator algebras

We show that, for the standard examples of strongly self-absorbing C^* -algebras, the action of the automorphism group on itself by conjugation is generically turbulent. Using this we then prove that, for all separable C^* -algebras which tensorially absorb the Jiang-Su algebra, the relation of conjugacy on automorphisms is not classifiable by countable structures. This includes the C^* -algebras that fall under the scope of classification results based on the Elliott invariant. The main novelty of our turbulence argument is the use of the malleability of the tensor product shift over a strongly self-absorbing C^* -algebra. This is joint work with M. Lupini, N.C. Phillips, and W. Winter.