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There is a non-Connes embeddable Equivalence Relation

Connes embeddability of a group is a finite dimensional approximation property. It turns out this property depends only on the group von Neumann algebra. The property can be extended to all tracial von Neumann algebras. The fact that there is a von Neumann algebra without this property was proved in 2020 using the quantum complexity result $MIP^*=RE$. It is still open for group von Neumann algebras. I will discuss the best-known partial result, which is that there is a group action without this property. In particular, this implies the negation to the Aldous-Lyons conjecture, a big problem in probability theory about finite approximability of a certain class of random graphs.