A continuum of C^*-norms on $\mathbb{B}(H) \otimes \mathbb{B}(H)$ and related tensor products

by
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Abstract

This is an account of joint work with N. Ozawa. For any pair M, N of von Neumann algebras such that the algebraic tensor product $M \otimes N$ admits more than one C^*-norm, the cardinal of the set of C^*-norms is at least $2^{\aleph_0}$. Moreover there is a family with cardinality $2^{\aleph_0}$ of injective tensor product functors for C^*-algebras in Kirchberg's sense. Let $\mathbb{B} = \prod_n M_n$. We also show that, for any non-nuclear von Neumann algebra $M \subset \mathbb{B}(\ell_2)$, the set of C^*-norms on $\mathbb{B} \otimes M$ has cardinality *equal to* $2^{2^{\aleph_0}}$. The talk will also recall the connection of such questions with the non-separability of the set of finite dimensional (actually 3-dimensional) operator spaces which goes back to a 1995 paper with Marius Junge, and several recent "quantitative" refinements obtained using quantum expanders