Irreducible inclusions of simple C^*-algebras

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Abstract

There are several naturally occurring interesting examples of inclusions of simple C^*-algebras with the property that all intermediate C^*-algebras likewise are simple. Moreover, in many cases one even has a Galois type classification of intermediate C^*-algebras of such inclusions. By analogy with von Neumann algebras, we refer to such inclusions as being C^*-irreducible. We give an intrinsic characterization of C^*-irreducible inclusions, and use this characterization to exhibit (and revisit) such inclusions, both known ones and new ones, arising from groups and dynamical systems. In a recent joint work with Echterhoff we show when inclusions of the form $A^H \subseteq A \rtimes G$ are C^*-irreducible, where G and H are groups acting on a C^*-algebra A, and use this to exhibit new C^*-irreducible inclusions with interesting properties. We explore an averaging technique introduced by Popa and show how this can be used both to prove irreducibility of certain inclusions arising from crossed products and to establish a classification of their intermediate C^*-algebras.