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Rigidity in von Neumann algebras of group actions

A free ergodic measure preserving action of a countable group on a probability space, $\Gamma \curvearrowright X$, gives rise to a von Neumann algebra (called II_1 *factor*) $L^\infty(X) \rtimes \Gamma$, through a natural crossed product type construction. In general, much of the initial data $\Gamma \curvearrowright X$ is "forgotten" by the isomorphism class of $L^\infty(X) \rtimes \Gamma$, for instance all free ergodic probability measure preserving actions of amenable groups give rise to isomorphic II_1 factors.

But a rich and deep rigidity theory underlies the non-amenable case. I will present some recent results in this direction, one of which shows that any isomorphism of von Neumann algebras associated with Bernoulli actions $\Gamma \curvearrowright [0,1]^\Gamma$, $\Lambda \curvearrowright [0,1]^\Lambda$, of Kazhdan groups Γ, Λ, comes from an isomorphism (conjugacy) of the actions. Some related cocycle rigidity results for group actions $\Gamma \curvearrowright X$ will be discussed as well.