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New examples of W^ and C^* -superrigid groups*

In the thirties F. J. Murray and J. von Neumann found a natural way to associate a von Neumann algebra $L(G)$ to every countable discrete group G . Classifying $L(G)$ in terms of G emerged overtime as a natural yet quite challenging problem as these algebras tend to have very limited "memory" of the underlying group. This is perhaps best illustrated by Connes' famous result asserting that all icc amenable groups give rise to isomorphic von Neumann algebras; thus in this case, besides amenability, the algebra has no recollection of the structure of underlying group. However, in the non-amenable regime the situation is far more complex; examples where the von Neumann algebraic structure is sensitive to various algebraic group properties have been discovered via Popa's deformation/rigidity theory. In this talk I will present new instances of groups G that are completely recognizable from $L(G)$. Our classes of examples include amalgamated free products, HNN extensions, and co-induced groups. In addition, I will discuss several applications to the study of rigidity in the C^* -setting. This is based on recent joint works with A. Diaz-Arias and D. Drimbe.