Actions of compact abelian groups on semifinite injective factors

by

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Introduction

The Clifford algebra construction allows one to associate with any unitary representation of a group an action of the group on an algebra in a functorial way. If the representation is infinite dimensional one must allow infinite dimensional algebras and one is led immediately to consider actions of groups on factors not of type I. Using this approach, Blattner showed in [1] that any separable locally compact group has a faithful action, by outer automorphisms and the identity, on the hyperfinite type II_1 factor $\mathcal{R}$. It was certainly not obvious at the time that one might hope to say much more about the actions even of finite cyclic groups on $\mathcal{R}$, but largely thanks to work of Connes, much progress has been made. This paper adds another step in a continuing project by giving a detailed description of all actions of a compact abelian group on semifinite injective factors.

The most general results on actions of abelian groups on von Neumann algebras appear in [10], where Connes and the second author established the relationship between their discrete and continuous decompositions of type III von Neumann algebras using the flow of weights, itself an action of **R** on an abelian von Neumann algebra.

The results of [10], powerful as they are, give precious little information on the