

Two nice Polish groups

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One of the most important object in the study of orbit equivalence of free, ergodic actions of countable groups is the notion of full group. Full groups of probability measure preserving actions were defined by Dye at the end of the fifties: they are Polish groups, that is topological groups whose topology is separable and given by a complete metric, which are the group of automorphisms of a probability space which can be piece-wise written as restrictions of the transformations induced by the elements of the group. In this talk we will discuss two classes of Polish groups which contain and generalize Dye's full groups: we will define full groups of actions of locally compact groups and exotic groups obtained as limit of finite special linear groups. In a joint work with François Le Maître, we extend the notion of full groups to actions of locally compact groups and we prove that, as in the discrete case, these groups are complete invariants of orbit equivalence. Moreover we show that they are extremely amenable if and only if the acting group is amenable, they generate the group measure space construction and, as opposed to the discrete case, any generic couple of elements generates a free dense subgroup. In joint work with Andreas Thom, we study the Polish group obtained as limit (with respect to the rank-metric) of special linear groups over a fixed finite field. This Polish group has a natural bi-invariant metric and it is the group of invertible elements of a von Neumann regular ring. We show that this group modulo its center is topologically simple, that it is extremely amenable, it has no non-trivial strongly continuous unitary representation and it has a discrete non amenable free subgroup.