Boomerang subalgebras of the group von Neumann algebra

Consider a countable discrete group Γ and its subgroup space-Sub(Γ), the collection of all subgroups of Γ. Sub(Γ) is a compact metrizable space with respect to the Chabauty topology (the topology induced from the product topology on $\{0,1\}^\Gamma$). The normal subgroups of Γ are the fixed points of $(\mathrm{Sub}(\Gamma), \Gamma)$. Furthermore, the Γ-invariant probability measures of this dynamical system are known as invariant random subgroups (IRSs).

Recently, Glasner and Lederle have introduced the notion of Boomerang subgroups. They generalize the notion of normal subgroups. Among many other remarkable results, they strengthen the well-known Margulis's normal subgroup Theorem.

More recently, in a joint work with Hartman and Oppelmayer, we introduced the notion of Invariant Random Algebra (IRA), an invariant probability measure on the collection of sub algebras of $L(\Gamma)$.

Motivated by the works of Glasner and Lederle, in ongoing joint work with Yair Glasner, Yair Hartman, and Yongle Jiang, we introduce the notion of Boomerang subalgebras in the context of $L(\Gamma)$. In this talk, we shall show that every Boomerang subalgebra of a torsion-free non-elementary hyperbolic group comes from a Boomerang subgroup. We shall also discuss its connection to understanding IRAs in such groups.