Covariant homogeneous nets of standard subspaces.

A canonical construction of the fundamental free field models was given by Brunetti Guido and Longo in 2002. The Brunetti-Guido-Longo (BGL) construction relies on the Bisognano-Wichmann (B-W) property and the implementation of a CPT operator in terms of the Tomita modular conjugations. In this way, given a particle - an irreducible (anti-)unitary positive energy representation of the symmetry group - the one-particle net on wedge regions is uniquely determined and its second quantization corresponds to the free field net.
In this talk we will present how this construction can be generalized. Given a Lie group G with a 2-grading, it is possible to define at the Lie algebra level an abstract object called wedge. This definition complies with G-covariance and fundamental wedge relative positions as the wedge inclusions (when a positive cone in the lie algebra is defined) and the wedge (spacelike) complement. Note that no spacetime is required for this construction. When the Lie algebra supports wedges it is possible to define an Haag-Kastler net on this set of wedges starting from an (anti-)unitary positive energy representation of the group assuming identifications analogously to (B-W) and the CPT-Tomita conjugations. This generalizes the Haag-Kastler picture, includes the most famous examples and gives perspectives on further possible models in QFT.

This talk is based on an ongoing joint work with K.-H. Neeb (Univ. Nürnberg-Erlangen).