Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

January 30 **Gandalf Lechner**, FAU Erlangen-Nürnberg

Title: *Modular Structure and Inclusions of Twisted Araki-Woods Algebras.*

In the general setting of twisted second quantization (including Bose/Fermi second quantization, Ssymmetric Fock spaces, and full Fock from free probability as special cases), von Neumann algebras on twisted Fock spaces are analyzed. These von Neumann algebras $L(T, H)$ are called twisted Araki-Woods algebras and depend on a selfadjoint twist operator T and a standard subspace H of the single particle Hilbert space. In this talk I will explain how the braid equation for T and an abstract version of the crossing symmetry from scattering theory encode for which $L(T, H)$ the Fock vacuum is a cyclic and separating vector, and what the corresponding modular data are. I will then consider two types of inclusions of twisted Araki-Woods algebras generated by inclusions $K \subset H$ of standard subspaces. If the inclusion is half-sided modular and the twist satisfies a norm bound, $L(T, K) \subset L(T, H)$ is shown to be singular. If the inclusion $K \subset H$ satisfies a nuclearity condition, $L(T, K) \subset L(T, H)$ has type III relative commutant for suitable twists T.

This is joint work with Ricardo Correa da Silva (arXiv: 2212.02298)