Speaker: **Alexander Stottmeister, University of Hannover**

Title: **Embezzlement of entanglement and the classification of von Neumann algebras**

Date: **Friday, May 17; 13.00 pm**

Place: **Seminar room 915**

Title: **Embezzlement of entanglement and the classification of von Neumann algebras**

Abstract:

We discuss the embezzlement of entanglement in the setting of von Neumann algebras and its relation to the classification of the latter. Embezzlement (of entanglement), introduced by van Dam and Hayden, denotes the task of producing any entangled state to arbitrary precision from a shared entangled resource state, the embezzling state, using local operations without communication while perturbing the resource arbitrarily little.

We show that Connes' classification of type III von Neumann algebras can be given a quantitative operational interpretation in terms of embezzlement. This quantification implies that all type III factors, apart from some type III_0 factors, host embezzling states. In contrast, semifinite factors (type I or II) cannot host embezzling states.

Type III_1 factors are characterized as 'universal embezzlers', meaning every normal state is embezzling. Our results follow from a one-to-one correspondence between embezzling states and invariant states on the flow of weights.

We demonstrate that (universal) embezzlement occurs in various relevant physical models, such as critical spin chains and quantum field theories. The latter observation provides a simple explanation for why relativistic quantum field theories maximally violate Bell inequalities.

This is joint work with Lauritz van Luijk, Reinhard F. Werner, and Henrik Wilming.