



WIMCS Mathematical Physics Cluster Workshop

Representations of Braid and Symmetric Groups ---- New Approaches

Aberystwyth University , 2nd to 3rd May 2011

Abstracts of Talks

Rolf Gohm (Aberystwyth, UK)

Independence from braid group representations

Abstract: In this survey talk we explain some basic ideas how we can proceed from representations of the infinite braid group on a noncommutative probability space (von Neumann algebra with state) to random variables which are stochastically independent (in the sense of commuting squares) and to corresponding factorization properties.

Grace Kennedy (Cardiff, UK)

A new algorithm for the Multivariable Alexander Polynomial of a link

Abstract: In 1923, Alexander discovered the Alexander Polynomial of a knot, and then in 1970, Conway published a multivariable version of the Alexander polynomial. Last spring, Stephen Bigelow gave a diagrammatic method for calculating the Alexander polynomial of a knot by resolving crossings in a knot or link in a planar algebra. I will present my multivariable version of Stephen Bigelow's calculation, which is the Multivariable Alexander Polynomial defined by Conway. The advantage of this algorithm is that it generalizes to a multivariable tangle invariant up to Reidemeister III.

Vijay Kodiyalam (Chennai, India)

From graphs to free products. Part I & II.

Abstract: We investigate a construction which associates a finite von Neumann algebra $M(\Gamma, \mu)$ to a finite weighted graph (Γ, μ) . The algebra $M(\Gamma, \mu)$ is shown to be a free product, with amalgamation over a finite-dimensional abelian subalgebra corresponding to the vertex set, of algebras associated to subgraphs 'with one edge' (or actually a pair of dual edges).

Claus Koestler (Aberystwyth, UK)

Representations of the infinite symmetric group from the viewpoint of noncommutative probability.

Abstract: Recently we have found an operator algebraic proof of the famous Thoma theorem which characterizes the extremal characters of the infinite symmetric group. We outline the main ideas of our approach and address possible future generalizations and applications of our results.

Speaker: Daan Krammer (Warwick, UK)

Garside groups and faithful representations of braid groups

Abstract: I will give a quick introduction to Garside groups in general and two well-known Garside structures on the braid group (one by Garside 1969, one by Birman-Ko-Lee 1998). I will describe how both are involved in a faithful representation of the braid group. Conversely, I will describe a tentative method how to find more Garside structures on the braid group from the same representation.

Speaker: Jennifer Maier (Cardiff, UK)

Equivariant Drinfeld double

Abstract: The Drinfeld double $D(G)$ of a finite group G gives rise to an extended topological field theory. For a second group J , we consider a J -equivariant extended field theory and extract a J -equivariant version of the Drinfeld double, a J -equivariant Hopf algebra.

Makoto Yamashita (Cardiff, UK)

On subfactors arising from asymptotic representations of symmetric groups.

Abstract: We consider the inclusions of von Neumann algebras associated to the finite factorial representations of the infinite symmetric group. This construction encompasses the Wassermann subfactor and the inclusion of the group von Neumann algebras associated to the regular representation. We discuss irreducibility and several other subfactor invariants of this construction in terms of the Thoma parameter.