

Paul Baum

DIRAC OPERATOR AND K-THEORY FOR DISCRETE GROUPS

Let G be a (countable) discrete group. This talk will give a statement of the Baum-Connes conjecture for G which uses spin-c manifolds and the Dirac operator. This statement is equivalent to the usual formulation of the conjecture using the universal example for proper actions of G . What are the advantages of this statement using spin-c manifolds? First, the Chern character (for the left side of BC) is obtained. Second, the connection of BC to the Atiyah-Singer index theorem is clearly revealed. Third, even for G finite (or compact), the spin-c manifold point of view gives a non-trivial statement. The above is joint work with N.Higson and T.Schick. In this work we give a K-cycle model for equivariant K-homology in the spirit of earlier joint work with R. Douglas in the non-equivariant case.

Etienne Blanchard

An extension theorem for continuous C^ -bundles*

In this talk, we review different Hahn-Banach extension properties in the framework of $C(X)$ -algebras. This notably gives a new characterisation of exactness for C^* -bundles (joint work with S. Wassermann).

Marius Dadarlat

Continuous fields of nuclear C^ -algebras*

We plan to survey recent results and discuss open problems concerning the structure and the K-theory of continuous fields of nuclear C^* -algebras.

Siegfried Echterhoff

K-theoretic fibrations

We study non-commutative analogues of Serre-fibrations in topology. We shall present several examples of such fibrations and give applications for the computation of the K-theory of certain C^* -algebras.

George Elliott

Intertwining for approximate homomorphisms

An axiomatic setting for approximate homomorphisms is described, in which the existence of both exact homomorphisms and isomorphisms can be proved.

Michel Enock

Measured Quantum Groupoids : axiomatics, examples, actions, geometrical construction

Highly inspired by the theory of locally compact quantum groups, a theory of measured quantum groupoids is here presented and developed; in particular, the notion of actions, crossed products, are introduced; a biduality theorem is obtained, and it is proved that the inclusion of the initial algebra into its crossed product is depth 2, which leads to another measured quantum groupoid. In particular, we associate to each action of a locally compact quantum group an example of a measured quantum groupoid.

Christina Ivan

Extended spectral triples and deformations

The talk is a report on a joint project with Erik Christensen. Starting with a concrete unital C^* -algebra A endowed with a *spectral triple* we construct a two-parameter family of spectral triples for certain extensions of A by the C^* -algebra of the compact operators. Our method generalizes the well known construction of the Toeplitz C^* -algebra as an extension of the C^* -algebra of continuous functions (endowed with the natural spectral triple coming from classic differentiation on the circle) by the C^* -algebra of compact operators on the Hardy space. The family of spectral triples associated via our general construction varies continuously (as compact quantum metric spaces) with respect to the parameters and this way creates a bridge between the *differential calculus* induced both on A and on the C^* -algebra of compacts by the given spectral triple.

Our general method provides families of spectral triples for the unitization of the C^* -algebra of compact operators and a slight modification of it spectral triples for the Podleś sphere.

David Evans

Modular invariants and twisted K-theory

I will describe the programme to understand modular invariant partition functions in conformal field theory via twisted equivariant K-theory.

Ulrik Kraehmer

On the Hochschild (co)homology of quantum homogeneous spaces

The aim of this talk is to report on a result establishing van den Bergh's version of Poincaré duality in the Hochschild (co)homology of quantum homogeneous spaces (right coideal subalgebras B of a Hopf algebra A for which A is faithfully flat as a B -module). It extends a recent result of Brown and Zhang that worked

for Hopf algebras themselves, and can be applied for example to prove the duality for the Podles quantum 2-spheres (standard, generic, and equatorial).

David Kyed

A quantum analogue of Følner's condition

A discrete group is known to amenable exactly when it satisfies Følner's condition which is a geometric condition on the action of the group on itself. I will discuss an analogue of Følner's condition for compact quantum groups which turns out to be equivalent to the notion of coamenability. If time permits, I will comment on the proof of this fact and discuss an application regarding the computation of L^2 -Betti numbers of coamenable, compact quantum groups.

Eric Leichtnam

On the analogy between Arithmetic Geometry and foliated spaces

Christopher Deninger has developed an infinite dimensional cohomological formalism which allows to prove the expected properties of the arithmetical Zeta functions (including the Riemann Zeta function). These cohomologies are, in general, not yet constructed Deninger has argued that these cohomologies might be constructed as leafwise cohomologies of suitably foliated spaces. We shall review some recent results which support this hope. For instance, we shall explain an analogy between some Lefschetz trace formulae for suitable foliated spaces and the explicit formulae in analytic number theory.

Ralf Meyer

Universal Coefficient Theorems for Kirchberg's KK-theory.

I describe a general approach to construct Universal Coefficient Theorems for Kirchberg's KK-theory for C^* -algebras over finite topological spaces. I discuss two examples: one where filtered K-theory is enough to get a UCT, and one where it is not and where we have to add another invariant to get a UCT.

Herve Oyono-Oyono

C^ -algebra for Penrose hyperbolic tilings (joint work with S. Petite, Université de Picardie)*

The (coloured) Penrose hyperbolic tilings are probably the most prominent examples of repetitive tilings of the Poincaré half-plane. Up to the action of the group G of affine transformations of the Poincaré half-plane, these tilings have a finite number of proto-tiles. To a such tiling is associated a lamination, transversally Cantor and equipped with a free, proper and leaf-preserving action

of the group G . In this lecture, we give a complete description of the C^* -algebra of this dynamical system and we compute explicitly its K -theory. We shall see that harmonic measures on the lamination give rise to a non trivial 3-cyclic cocycles and we establish in this setting higher gap-labelling formulae.

Florin Radulescu

Hecke operators and type III factors

We construct a generalized semigroup of completely positive maps on type III factors, which in the case of $Sl(2, \mathbb{Z})$ corresponds (via Berezin quantization) to the classical Hecke operator on Mass forms

Andreas Thom

L2-invariants and negatively curved groups

I present results about the structure of a wide class of infinite groups which were obtained in collaboration with Jesse Peterson (Berkeley). Using L^2 -cohomology we obtained strong results about the subgroup structure of groups with positive first L^2 Betti number. Moreover, some results extend to other classes of groups with weaker negative curvature properties (like hyperbolic groups). The results generalize several central results in geometric and combinatorial group theory.

Simon Wassermann

MASAs, tensor products and the extension property

It has been known since the 1970s that the closure of the algebraic tensor product of maximal abelian self-adjoint C^* -subalgebras (MASAs) of two C^* -algebras is maximal abelian in the minimal C^* -tensor product of the containing C^* -algebras. It turns out that this only remains true for other C^* -tensor products if one of the MASAs has the extension property for pure states in the unital case. If neither MASA has the extension property there are examples where their tensor product is not maximal abelian. These result have interesting connections with some long-standing open questions.

Wilhelm Winter

Topological and algebraic regularity properties of nuclear C^ -algebras*

We report on recent advances in Elliott's program to classify nuclear C^* -algebras. In particular, we give some results exhibiting the subtle interplay between noncommutative covering dimension and almost unperforation of the Cuntz semigroup. This relation often manifests itself as D -stability, where D is a strongly self-absorbing C^* -algebra.

Guoliang Yu

K-theory for expanders

I will discuss K-theory for a certain expanders. In particular, I will discuss a geometric condition and its application to the coarse Novikov conjecture for expanders.