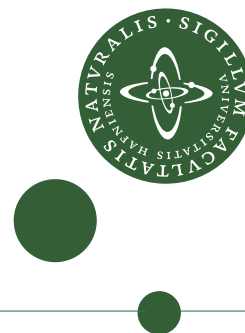


Midterm Review and Conference
EU-NCG, Non-Commutative Geometry



Program

Monday September 28 at 14:30 - Tuesday September 29 at noon

Title: Midterm review program

Pages: 2-3

Tuesday September 29 at 13.15 - Friday October 2 at 14.25

Title: Conference

Pages: 4-9

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Schedule, page 4.

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Abstracts of talks, pages 10-19.

List of participants, pages 20-21.

September 23, 2009

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EU-NCG Mid Term Review: 28 and 29 September, Copenhagen Denmark**Agenda****Monday, 28 September 2.30**

1. Introduction Dr Lidija Matija

2. Overview David Evans

3. Team and Young Researcher Reports

Node 1, Cardiff

Co-ordinator:	David Evans	4 minutes
Appointees:	ESR Claire Shelly	6 minutes
	ER Pinhas Grossman	6 minutes

Node 2, DIAS

Co-ordinator:	Denjoe O'Connor	4 minutes
Appointees:	ESR Thomas Kaltenbrunner	6 minutes

Nodes 3,4, Copenhagen/Odense

Co-ordinator:	Ryszard Nest	4 minutes
Appointees:	ESR Chiara Esposito	6 minutes
	ESR George Napolitano	6 minutes
	ESR Stella Anevski	6 minutes
	ER Pawel Kasprzak	6 minutes

Node 5, Rome

Co-ordinator:	Laszlo Zsido	4 minutes
Appointees:	ESR Liviu Păunescu	6 minutes
	ER Henning Bostelmann	6 minutes

Node 6, Oslo

Co-ordinator:	Sergey Neshveyev	4 minutes
Appointees:	ESR Amin Malik	6 minutes

11. IMAR

Co-ordinator:	Serban Stratila	4 minutes
Appointees:	ER Bernhard Burgstaller	6 minutes

Node 7, CNRS

Co-ordinator:	Emmanuel Germain	4 minutes
Appointees:	ESR Daniele Pranzetti	6 minutes
	ESR Bora Yalkinoglu	6 minutes
	ER Ana-Maria Stan	6 minutes

Node 10, ESI

Co-ordinator:	Klaus Schmidt	4 minutes
Appointees:	ESR Eric Morfa-Morales	6 minutes
	ER Gandalf Lechner	6 minutes

Node 9, Leuven

Co-ordinator:	Stefaan Vaes	4 minutes
Appointees:	ESR Anselm Knebusch	6 minutes

Node 8, Münster

Co-ordinator:	Raimar Wulkenhaar	4 minutes
Appointees:	ESR Bernardino Spisso	6 minutes
	ESR/ER Pierre Clare	6 minutes

Tuesday, 29 September

4 [9.30 am] Meeting between young researchers (ER and ESR) and Project Officer

5 [11.00 am] Open discussion

6 [12.00] Presentation by Project Officer about FP7 and further opportunities for young researchers and networks

Conference in connection with the Mid-Term- Review of the EU grant NCG, Noncommutative Geometry.

September 28 - October 2, 2009, University of Copenhagen

Schedule for the talks:

A number next to a name is the lecture hall number.

Time	Mon. Sept. 28	Tue. Sept. 29	Wed. Sept. 30	Thu. Oct. 1	Fri. Oct. 2	Friday
9:00-9:45	NCG	NCG	Radulescu 6	O'Connor 3	Werner 8	9:15-10:00
9:55 - 10:25	Mid-Term- Review	Mid-Term- Review	Kyed 6	Fidaleo 3	Martinetti 1	10:10-10:40
10:35-11:20	Meet in 04.4.19 on the top floor	Aud. 3 Start 9:30.	Wulkenhaar 6	Silvestrov 3	Musat 1	10:50-11:35
11:30-12:00	You may use the facilities.		Grossman 6	Yalkinoglu 3	Clare 1	11:45-12:15
13:15-14:15	Soft drinks outside. Sandwiches at 13.	Vaes 2	Boca 4	Archbold 3	Fima 1	13:15-13:45
14:25-14:55	Review at 14:30 in Auditorium 2.	Kaad 2	Pugh UP1	Lechner 3	Aastrup 1	13:55-14:25
15:15-15:45	Room 4.19 may be used	Deprez 2	Kasprzak 4	Burgstaller 3		
15:55-16:25	during the week.	Morsella 2	Bostelmann 4	Hillier 3		
16:35-17:05		Pranzetti 2	Savinien 4	Jain 3		

Last modified: Wed Sep 23 21:22:05 Romance Standard Time 2009

List of speakers

Aastrup Johannes, time: 13.55-14.25, place: Aud. 1, Friday
Archbold Robert, time: 13.15-14.15, place: Aud. 3, Thursday
Boca Florin, time: 13.15-14.10, place: Aud. 4, Wednesday
Bostelmann Henning, time: 15.55-16.25, place: Aud. 4, Wednesday
Burgstaller Bernhard, time: 15.15-15.45, place: Aud. 3, Thursday
Clare Pierre, time: 11.45-12.15, place: Aud. 1, Friday
Deprez Steven, time: 15.15-15.45, place: Aud. 2, Tuesday.
Fidaleo Francesco, time: 9.55-10.25, place: Aud. 3, Thursday
Fima Pierre, time: 13.15-13.45, place: Aud. 1, Friday
Grossman Pinhas, time: 11.30-12.00, place: Aud. 6, Wednesday
Hillier Robin, time: 15.55-16.25, place: Aud. 3, Thursday
Jain Ranjana, time: 16.35-17.05, place: Aud. 3, Thursday
Kaad Jens, time: 14.25-14.55, place: Aud. 2, Tuesday.
Kasprzak Pawel, time: 15.15-15.45, place: Aud. 4, Wednesday
Kyed David, time: 9.55-10.25, place: Aud. 6, Wednesday
Lechner Gandalf, time: 14.25-14.55, place: Aud. 3, Thursday
Martinetti Pierre, time: 10.10-10.40, place: Aud. 1, Friday
Morsella Gerardo, time: 15.55-16.25, place: Aud. 2, Tuesday.
Musat Magdalena, time: 10.50-11.35, place: Aud. 1, Friday.
O'Connor Denjoe, time: 9.00-9.45, place: Aud. 3, Thursday.
Pranzetti Daniele, time: 16.35-17.05, place: Aud. 2, Tuesday
Pugh Mathew, time: 14.25-14.55, place: Aud. Lille UP-1, Wednesday
Radulescu Florin, time: 9.00-9.45, place: Aud. 6, Wednesday
Savinien Jean, time: 16.35-17.05, place: Aud. 4, Wednesday
Silvestrov Sergei, time: 10.35-11.20, place: Aud. 3, Thursday
Vaes Stefaan, time: 13.15-14.15, place: Aud. 2, Tuesday
Werner Wend, time: 9.15-10:00, place: Aud. 8, Friday
Wulkenhaar Raimar, time: 10.35-11.20, place: Aud. 6, Wednesday
Yalkinoglu Bora, time: 11.30-12.00, place: Aud. 3, Thursday



Begivenheder tirsdag den 29. september 2009

NCG Conference

Several Talks

Taler(e): **Vaes, Kaad, Deprez, Morsella, Pranzetti**

Tirsdag den 29. september 2009 kl. 09:30-17:05. Sted: Aud. 2, Aud. 3.

Sprog: engelsk.

9.30-12.00

Title: NCG Mid-Term-Review

Place: Aud. 3

13.15-14.15

Stefaan Vaes, K.U.Leuven

Title: Rigidity of group measure space II₁ factors

Place: Aud. 2

14.25-14.55

Jens Kaad, University of Copenhagen

Title: Invariance results for pairings with algebraic K-theory

Place: Aud. 2

15.15-15.45

Steven Deprez, K.U.Leuven

Title: A classification of all finite-index subfactors for a class of II₁ factors

Place: Aud. 2

15.55-16.25

Gerardo Morsella, Tor Vergata University, Roma

Title: Scaling limits, subsystems and superselection theory

Place: Aud. 2

16.35-17.05

Daniele Pranzetti, CPT Marseille, Université de Provence

Title: On The Regularization Of The Constraints Algebra Of Quantum Gravity In 2+1 Dimensions With Non-vanishing Cosmological Constant

Place: Aud. 2

September 2009						
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Begivenheder onsdag den 30. september 2009

NCG Conference

Several Talks

Taler(e): **Radulesco, Kyed, Wulkenhaar, Grossman, Boca, Pugh, Kasprzak, Bostelmann, Savinien**

Onsdag den 30. september 2009 kl. 09:00-17:05. Sted: Aud. 4, Aud. 6, Aud Lille Up1. Sprog: engelsk.

9.00-9.45

Florin Radulescu, Rome

Title: Quantum dynamics and some problems in Number Theory

Place: Aud. 6

9.55-10.25

David Kyed, University of Göttingen

Title: An L^2 -Künneth formula for tracial algebras

Place: Aud. 6

10.35-11.20

Raimar Wulkenhaar, University of Münster

Title: Non-compact spectral triples

Place: Aud. 6

11.30-12.00

Pinhas Grossman, Cardiff University

Title: Quadrilaterals of factors

Place: Aud. 6

13.15-14.15

Florin Boca, IMAR and University of Illinois

Title: Some noncommutative structures associated with continued fractions

Place: Aud. 4

14.25-14.55

Mathew Pugh, Cardiff University

Title: Spectral Measures and Generating Series for Nimrep Graphs in Subfactor Theory

Place: Aud. Lille UP-1

15.15-15.45

Pawel Kasprzak, University of Copenhagen

Title: Rieffel deformation via crossed products

Place: Aud. 4

15.55-16.25

Henning Bostelmann, York

Title: On the short-distance scaling limit in quantum field theory

Place: Aud. 4

16.35-17.05

Jean Savinien, Institut Camille Jordan, Lyon, France

Title: Transverse Laplacians for substitution tilings

Place: Aud. 4



Begivenheder torsdag den 1. oktober 2009

NCG Conference

Several Talks

Taler(e): **O'Connor, Fidaleo, Silvestrov, Yalkinoglu, Archbold, Lechner, Burgstaller, Hillier, Jain**

Torsdag den 1. oktober 2009 kl. 09:00-17:05. Sted: Aud. 3. Sprog: engelsk.

9.00-9.45

Denjoe O'Connor, Dublin Institute for Advanced Studies

Title: Emergent and Evaporating geometry

Place: Aud. 3

9.55-10.25

Francesco Fidaleo, University Tor Vergata of Rome

Title: On the entangled ergodic theorem

Place: Aud. 3

10.35-11.20

Sergei Silvestrov, Lund University

Title: Non-invertible dynamics and generalized crossed product

C*-algebras: non-free actions, ideals and maximal abelian subalgebras

Place: Aud. 3

11.30-12.00

Bora Yalkinoglu, Paris 6

Title: Bost-Connes type systems and Complex Multiplication

Place: Aud. 3

13.15-14.15

Robert Archbold, University of Aberdeen

Title: Ideal structure in multiplier algebras of C*-algebras

Place: Aud. 3

14.25-14.55

Gandalf Lechner, Vienna

Title: Rieffel deformations and the construction of local nets

Place: Aud. 3

15.15-15.45

Bernhard Burgstaller, Doppler Institute for mathematical physics

Title: Equivariant KK-theory for semimultiplicative sets

Place: Aud. 3

15.55-16.25

Robin Hillier, Tor Vergata

Title: Spectral triples for conformal field theory

Place: Aud. 3

16.35-17.05

Ranjana Jain, Delhi University, India

Title: Operator space projective tensor product of C*-algebras

Aud. 3



Begivenheder fredag den 2. oktober 2009

NCG Conference

Several Talks

Taler(e): **Werner, Martinetti, Musat, Clare, Fima, Aastrup**

Fredag den 2. oktober 2009 kl. 09:15-14:25. Sted: Aud. 1, Aud. 8. Sprog: engelsk.

9.15-10.00

Wend Werner, University of Münster

Title: The geometry of infinite dimensional Banach manifolds

Place: Aud. 8

10.10-10.40

Pierre Martinetti, Universität Göttingen

Title: Spectral distance on the Moyal plane

Place: Aud. 1

10.50-11.35

Magdalena Musat, University of Copenhagen

Title: Factorization and dilation problems for completely positive maps on von Neumann algebras

Place: Aud. 1

11.45-12.15

Pierre Clare, Université d'Orléans / WWU Münster

Title: Hilbert modules and intertwiners associated to principal series

Place: Aud. 1

13.15-13.45

Pierre Fima, Kuleuven

Title: Property T and Haagerup property for discrete quantum groups

Place: Aud. 1

13.55-14.25

Johannes Aastrup, University of Münster

Title: Spectral triples in noncommutative geometry

Place: Aud. 1

Oktober 2009						
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1 Tuesday

Rigidity of group measure space II_1 factors

Stefaan Vaes, K.U.Leuven

Abstract: Using the group measure space construction of Murray and von Neumann (1943), countable groups and their actions on measure spaces give rise to von Neumann algebras. Probability measure preserving actions that are ergodic and essentially free, lead to II_1 factors. After a survey of Popa's deformation/rigidity theory, I will speak about the following two joint results with Popa.

- The construction of W^* -superrigid group actions. These are group actions whose associated II_1 factor entirely remembers the group and the action out of which it was constructed.
- The construction of II_1 factors (acting on separable Hilbert spaces) with uncountable fundamental groups different from \mathbb{R}_+ .

The talk will be introductory, assuming no advanced knowledge about II_1 factors.

Invariance results for pairings with algebraic K -theory

Jens Kaad, University of Copenhagen

Abstract: We prove that the multiplicative character of A. Connes and M. Karoubi is invariant under perturbations by Schatten ideal operators. This motivates the definition of a finitely summable K -homology type functor. By means of the multiplicative character the abelian groups which it produces then admit a non-trivial pairing with algebraic K -theory.

A classification of all finite-index subfactors for a class of II_1 factors

Steven Deprez, K.U.Leuven

Abstract: Given a II_1 factor M associated to a good generalised Bernoulli action of a weakly rigid group, we give a full classification of all finite-index subfactors of M up to unitary conjugacy. In particular, we can compute Jones' invariant $\mathcal{C}(M)$, i.e. the set of all the indices $[M : P]$ of irreducible finite-index subfactors $P \subset M$, for some concrete examples.

Scaling limits, subsystems and superselection theory

Gerardo Morsella, Tor Vergata University, Roma

Abstract: Given and inclusion of (graded) local nets, the structure of the corresponding inclusion of scaling limit nets is analysed. In particular, conditions are given under which the unicity of the scaling limit of the bigger net implies unicity also for the limit of the smaller one. In the case of an inclusion of local nets with the same canonical field net, sufficient conditions are discussed which entail that the scaling limit nets also give rise the same field net.

On The Regularization Of The Constraints Algebra Of Quantum Gravity In 2+1 Dimensions With Non-vanishing Cosmological Constant

Daniele Pranzetti, CPT Marseille, Université de Provence

Abstract: 3-dimensional quantum gravity can be defined from a number of different points of view. For what concerns Loop Quantum Gravity (LQG), in the case of vanishing cosmological constant the theory has been quantized by Noui and Perez and the algebra of the regularized constraints is anomaly free in this case. In the case of non-vanishing cosmological constant there is not a quantization of the theory in LQG yet. In this work we make a first step into this direction by introducing a regularization for the constraints algebra. Some of the ambiguities which arise in the process of quantization of the theory can be resolved taking the classical algebra as a guiding tool. The result obtained is not anomaly free and the local symmetry appears to be deformed. What connection this has with quantum groups is not clear yet.

2 Wednesday

Quantum dynamics and some problems in Number Theory

Florin Radulescu, Rome

Abstract: We use operator algebra techniques and dilation theory for completely positive maps (and 2-algebras in the sense of Vershik) for a new approach to some conjectures regarding spectrum of arithmetic operators.

An L^2 -Künneth formula for tracial algebras

David Kyed, University of Göttingen

Abstract: I will discuss a Künneth formula computing the Connes-Shlyakhtenko L^2 -Betti numbers of an algebraic tensor product of two tracial algebras in terms of the L^2 -Betti numbers of the algebras in question. If time permits, I will explain how this gives rise to quantum groups with a non-vanishing first L^2 -Betti number.

Non-compact spectral triples

Raimar Wulkenhaar, University of Münster

Abstract: In order to extend the spectral action principle to non-compact spaces, we propose a framework for spectral triples where the algebra may be non-unital but the resolvent of the Dirac operator remains compact. An example is given by the supersymmetric harmonic oscillator. The two different Dirac operators provide two representations of the volume form in the Hilbert space, and only their product is the grading operator.

We also compute the spectral action for the corresponding Connes-Lott two-point model. There is an additional harmonic oscillator potential for the Higgs field, whereas the Yang-Mills part is unchanged. The total Higgs potential shows a two-phase structure with smooth transition between them: In the spontaneously broken phase below a critical radius, all fields are massive, with the Higgs mass slightly smaller than the NCG prediction. In the unbroken phase above the critical radius, gauge fields and fermions are massless, whereas the Higgs field remains massive.

Quadrilaterals of factors

Pinhas Grossman, Cardiff University

Abstract: A quadrilateral of factors is a square of von Neumann algebras with trivial centers. For a noncommuting irreducible finite-index quadrilateral whose sides are "2-supertransitiv", there are severe restrictions on the possible configurations. In particular, there are exactly seven noncommuting, irreducible quadrilaterals with sides of index less than or equal to four, up to isomorphism of the standard invariant. This is joint work with Masaki Izumi.

Some noncommutative structures associated with continued fractions

Florin Boca, IMAR and University of Illinois

Abstract: We consider a certain AF algebra associated with the Farey tessellation, naturally incorporating the continued fraction algorithm. This algebra provides a candidate for a noncommutative space on which one can try to extend some classical transformations associated with continued fractions, such as the Gauss or Farey maps.

Spectral Measures and Generating Series for Nimrep Graphs in Subfactor Theory

Mathew Pugh, Cardiff University

Abstract: The spectral measures for nimrep graphs arising in subfactor theory are determined. The methods used give an alternative approach to deriving the results of Banica and Bisch for $SU(2)$ *ADE* graphs and subgroups of $SU(2)$ and explain the connection between their results for affine *ADE* graphs and the Kostant polynomials. These methods allow an easy generalization to $SU(3)$, where the spectral measures for nimreps associated with $SU(3)$ modular invariants and subgroups of $SU(3)$ are determined.

Rieffel deformation via crossed products

Pawel Kasprzak, University of Copenhagen

Abstract: The aim of this talk is to present a description of the Rieffel Deformation in terms of crossed products. The starting point of our construction is an action of an abelian group G on a C^* -algebra A . The crossed product algebra of A by the action of G is canonically equipped with the dual action of the dual group of G . The algebra A can be embedded into this crossed product and it is characterized by the Landstad conditions, one of which is the invariance with respect to the dual action. Using a 2-cocycle on the dual group one can deform the dual action and the Rieffel Deformation of A is defined as the Landstad algebra for this deformed dual action. A particular benefits of our approach are immediate proofs of invariance of K -groups and preservation of nuclearity under the Rieffel Deformation.

On the short-distance scaling limit in quantum field theory

Henning Bostelmann, York

Abstract: TBA.

Transverse Laplacians for substitution tilings

Jean Savinien, Institut Camille Jordan, Lyon, France

Abstract: Pearson and Bellissard recently built a spectral triple for ultrametric Cantor sets. They derived a family of Laplace-Beltrami like operators on those sets. Motivated by the applications to specific examples, we revisit their work for the transversals of tiling spaces, which are particular self-similar Cantor sets. We use Bratteli diagrams to encode the self-similarity, and Cuntz-Krieger algebras to implement it. We show that the abscissa of convergence of the zeta-function of the spectral triple gives indications on the exponent of complexity of the tiling. We determine completely the spectrum of the Laplace-Beltrami operators, give an explicit method of calculation for their eigenvalues, compute their Weyl asymptotics, and a Seeley equivalent for their heat kernels.

3 Thursday

Emergent and Evaporating geometry

Denjoe O'Connor, Dublin Institute for Advanced Studies

Abstract: Spacetime geometry may not always have existed, it may in fact be an emergent low energy concept. A simple model is described in which a geometrical phase emerges as the system is cooled. The phenomenon is illustrated by a simple three matrix model. More generally a new universality class of topological phase transitions is discussed in which the underlying geometry undergoes a phase transition.

On the entangled ergodic theorem

Francesco Fidaleo, University Tor Vergata of Rome

Abstract: We discuss the entangled ergodic theorem for certain relevant situation, that is the convergence in the strong, or merely weak operator topology of the Cesaro mean

$$\frac{1}{N^k} \sum_{n_1, \dots, n_k=0}^{N-1} U^{n_{\alpha(1)}} A_1 U^{n_{\alpha(2)}} \dots$$

$$U^{n_{\alpha(m-1)}} A_{m-1} U^{n_{\alpha(m)}}.$$

Here U is a unitary operator acting on the Hilbert space \mathcal{H} , A_1, \dots, A_{m-1} are bounded operators acting on \mathcal{H} , and $\alpha : \{1, \dots, m\} \mapsto \{1, \dots, k\}$ is a partition of the set $\{1, \dots, m\}$ in k parts. The situation of interest will be the case when the A_j are compact, without any condition on the spectrum of U , the case when U is almost periodic without any condition on the A_j , and finally a case arising from "quantum diagonal measures".

Non-invertible dynamics and generalized crossed product C*-algebras: non-free actions, ideals and maximal abelian subalgebras

Sergei Silvestrov, Lund University

Abstract: The results presented in this talk are motivated by the pioneering works of Archbold, Spielberg, Tomiyama, Zeller-Meier and others in 1960th-1990th establishing close relation between topological freeness properties of invertible topological dynamical systems and actions of groups, intersection properties of ideals and the maximal commutativity of a canonical subalgebra in the corresponding crossed product C*-algebras. This type of results play pivotal role in understanding the structure and classifications of crossed products C*-algebras and the interplay of C*-algebras and dynamical systems. They are important also for representation theory and for its applications in analysis of quantum systems involving non-commutative dynamics. In this talk I will present some recent developments of the corresponding results and notions for non-invertible dynamics and associated generalizations of crossed product algebras, and also new approaches and results in the contexts where the dynamics might involve non-Hausdorff spaces or is not topologically free. This talk is partially based on new results and on recent joint works with Toke Meier Carlsen, Johan Öinert, Christian Svensson, Jun Tomiyama and Marcel de Jeu.

Bost-Connes type systems and Complex Multiplication

Bora Yalkinoglu, UPMC, Paris

Abstract: In explicit class field theory (known as Hilbert's 12th problem) one tries to construct explicit generators of the maximal abelian extension K^{ab} of a number field K . This problem has been solved completely only in the case of $K = \mathbb{Q}$ or K an imaginary quadratic field. Further there are some partial results for K equal to a CM-field (i.e. a totally quadratic extension of a totally real extension of \mathbb{Q}) based on the beautiful theory of Complex

Multiplication, the case of imaginary quadratic fields being a special case. In their famous 1995 paper J.-B. Bost and A. Connes laid down an operator-theoretic approach to the above problem by solving the following problem in the case of $K = \mathbb{Q}$. A C^* -dynamical system $\mathcal{A}_K = (A_K, \sigma_t)$ associated to a number field K is called Bost-Connes type system if it fullfills (among other things) the following three properties

- i) the Galois group $Gal(K^{ab} = K)$ of the maximal abelian extension K^{ab} of K is acting as symmetries on \mathcal{A}_K ;
- ii) the partition function of \mathcal{A}_K is given by the Dedekind zeta function ζ_K ;
- iii) there is a K -rational subalgebra $Aarith \mathcal{A}_K$ such that extremal KMS_∞ states evaluated on this subalgebra generate K^{ab} .

Ten years later in 2005 A. Connes, M. Marcolli and N. Ramachandran constructed Bost-Connes type systems \mathcal{A}_K for arbitrary imaginary quadratic fields based on the theory of Complex Multiplication.

In our talk we will show how to extend the results of the latter by using the work of E. Ha and F. Paugam, the work of M. Laca, N.Larsen and S. Neshveyev and the full power of the theory of Complex Multiplication to the case of a general CM fields K , thus providing a partial solution of the problem of constructing a Bost-Connes \mathcal{A}_K type system for a CM-field K .

Ideal structure in multiplier algebras of C^* -algebras

Robert Archbold, University of Aberdeen

Abstract: We discuss joint work with Somerset on ideal structure in the multiplier algebra $M(A)$ of a separable, non-unital C^* -algebra A . The motivation comes from recent results for specifically unital C^* -algebras by various authors on topics such as norms of inner derivations, the central Haagerup tensor product, and $C_0(X)$ -algebras. What conditions on A will allow these theorems to be applied to $M(A)$?

Rieffel deformations and the construction of local nets

Gandalf Lechner, Vienna

Abstract: In this talk I will explain how the C^* -algebraic deformation procedure introduced by Rieffel can be applied to the problem of deforming quantum field theories in a way which is compatible with covariance and locality. (joint work with D.Buchholz and S.J.Summers)

Equivariant KK -theory for semimultiplicative sets

Bernhard Burgstaller, Doppler Institute for mathematical physics

Abstract: A semimultiplicative set G is a set G with a partially defined multiplication. To compensate the lack of inverses in G , one requires always both a left and a right action of G on a set, or an algebra, or another category. One can construct a reduced and a full crossed product of G with C^* -algebras, and there are some generalised Cuntz–Krieger algebras which arise as such reduced crossed products. Our main result is the introduction of a G -equivariant KK -theory, quite parallel to Kasparov’s equivariant theory for groups G . We have verified the existence of an intersection product and a descent homomorphism.

Spectral triples for conformal field theory

Robin Hillier, Tor Vergata

Abstract: Conformal nets as an essential ingredient of operator algebraic conformal field theory are reviewed. In the recent noncommutative geometrization programme, we want to associate geometric quantities and invariants like spectral triples and cohomology classes to field theoretic quantities and invariants like subfactors, their indices, and modular operators. We explain these general ideas and present some first firm results and examples.

Operator space projective tensor product of C^* -algebras

Ranjana Jain, Delhi University, India

Abstract: We prove that for C^* -algebras A and B , a jointly completely bounded bilinear map from $A \times B$ into \mathbb{C} can be extended uniquely to a (j.c.b.) norm preserving normal jointly completely bounded bilinear map from $A^{**} \times B^{**}$ into \mathbb{C} . We use this to prove that the natural embedding of $A^{**} \widehat{\otimes} B^{**}$ into $(A \widehat{\otimes} B)^{**}$ has a continuous inverse, where $\widehat{\otimes}$ is the operator space projective tensor product. Further, we study the (closed) ideal structure of $A \widehat{\otimes} B$, which, in particular, determines the lattice of closed ideals of $B(H) \widehat{\otimes} B(H)$ completely.

4 Friday

The geometry of infinite dimensional Banach manifolds

Wend Werner, University of Münster

Abstract: Infinite dimensional Banach manifolds puzzle their friends with a number of unpleasant features. Among these is the fact that Hilbert spaces are so rare among Banach spaces that the theory of Riemannian manifolds is no longer of much use here. It is thus an interesting problem to see what substitutes there might be.

In this talk we have a look at Hilbert- C^* manifolds, and, in a rather concrete example, discuss to what extent important geometrical concepts like the Levi-Civita connection survive.

Spectral distance on the Moyal plane

Pierre Martinetti, Universität Göttingen

Abstract: We will compute Connes' distance formula associated to the spectral triple of the Moyal plane.

Factorization and dilation problems for completely positive maps on von Neumann algebras (Joint work with Uffe Haagerup)

Magdalena Musat, University of Copenhagen

Abstract: We study factorization and dilation properties for completely positive unital, trace-preserving maps (for short, c.p.u.t. maps) on von Neumann algebras. The starting point for our work has been the question of existence of non-factorizable Markov maps and semigroups of such, as formulated by Anantharaman-Delaroche in 2004. We provide simple examples of non-factorizable c.p.u.t. maps on the $n \times n$ matrices for $n \geq 3$, as well as an example of a one-parameter semigroup $(T_t)_{t \geq 0}$ of c.p.u.t. maps on the 4×4 matrices such that T_t fails to have the Markov dilation property for all small values of $t > 0$. Further, we study the noncommutative Rota dilation property introduced by Junge, Le Merdy and Xu in 2006 in connection with their work on semigroups of operators acting on noncommutative L_p -spaces. We show that the most natural generalization of Rota's classical dilation theorem to the noncommutative setting does not hold, by providing an example of a self-adjoint c.p.u.t. map T on the $n \times n$ matrices for some large n , such that T^2 does not have the noncommutative Rota dilation property. This work has revealed nice applications to finding estimates for the best

constant in the noncommutative little Grothendieck inequality. Also, very recently we solved an open question concerning an asymptotic version of the quantum Birkhoff conjecture by using these techniques.

Hilbert modules and intertwiners associated to principal series

Pierre Clare, Université d'Orléans / WWU Münster

Abstract: TBA

Property T and Haagerup property for discrete quantum groups

Pierre Fima, Kuleuven

Abstract: We will explain Property T and Haagerup Property for discrete quantum groups, discuss the basic properties and give some examples.

Spectral triples in noncommutative geometry

Johannes Aastrup, University of Münster

Abstract: TBA

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