Submittee: Marcelo Laca
Date Submitted: 2009-08-17 13:22
Title: KMS states and noncommutative geometry
Event Type: Conference-Workshop

Location:
University of Victoria

Dates:
June 29 to July 3 (Minicourses) July 6 to July 10 (Workshop)

Topic:
Noncommutative geometry, index theory, analytic spectral flow, Breuer index theory, C*-dynamical systems and KMS states, modular index theory.

Methodology:
Minicourses: Three series of four one-hour lectures each. Notes were distributed for all the lectures. Daily discussion and question and answer sessions of at least one hour duration. Workshop: Lectures by leading scientists and by junior researchers.

Objectives Achieved:
Significant progress on the classification of the Carey-Phillips-Rennie systems (notably incorporating K-theory techniques of I. Putnam, and application of earlier work of Laca-Spielberg on boundary actions),

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Scientific Highlights:
There was a significant exchange of current research that had not been previously circulated, enabling transfer of techniques and results, and generating instant feedback and further research projects (this was to a large extent facilitated by the format and the choice of topics and participants). A class of examples of the twisted index theory of Carey-Phillips-Nest-Neshveyev-Rennie was launched by C-P-R, and to a large extent, their analysis was completed partly thanks to the exchange of ideas around the workshop. There was discussion on the conditions for algebras with a circle action to be a bimodule algebra (Abadie-Exel-Nest-Rennie), and the potential for further applications of the work of Laca-Neshveyev on further study of phase transitions for these algebras. The discussion sessions (particularly those run by Rennie) were a hit among the junior participants who felt at ease asking for examples and explanations in an atmosphere that was more relaxed than the formal lectures. Several attendees expressed their interest in participating in the PIMS sponsored Summer School on Operator Algebras at UVIC next year.

Organizers:
Alan Carey, Nigel Higson, Marcelo Laca, John Phillips.

Speakers:
Mini-course Lecturers: John Phillips, Department of Mathematics and Statistics, University of Victoria; Von Neumann algebras and Breuer theory. Alan Carey, Mathematical Sciences Institute, Australian National University; Analytic spectral flow.   Adam Rennie, Mathematical Sciences Institute, Australian National University; An introduction to NCG via index theory.   Marcelo Laca, Department of Mathematics and Statistics, University of Victoria; C*-dynamical systems and KMS states.   Workshop Talks: Beatriz Abadie, Centro de Matematicas, Universidad del Uruguay Takai duality for crossed products by Hilbert C*-bimodules. Nathan Brownlowe, School of Mathematics and Statistics, University of Wollongong, Australia, Exel crossed products: applications and extensions. Ivan Dynov, Department of Mathematics and Statistics, York University, Type III von Neumann algebras generated by regular representations of infinite-dimensional nilpotent groups. David Evans, School of Mathematics, Cardiff University, Modular invariants, subfactors, spectral measures and twisted equivariant K-theory. Ruy Exel, Departamento de Matematicas, Universidade Federal de Santa Catarina, Florianopolis, Brazil, Interaction groups. Farzad Fathi Zadeh, Department of Mathematics, University of Western Ontario, Connesâ€™ Character Formula and Twisted Spectral Triples. Magda Georgescu, Department of Mathematics and Statistics, University of Victoria Analytic Formulas for Spectral Flow. Nigel Higson, Department of Mathematics, Penn State University, On Connes' Godbillon-Vey theorem. Alex Kumjian, University of Nevada, Reno, Hausdorff Measures and KMS States. Matthias Lesch, Mathematisches Institut, Bon University, Germany, Relative Connes-Chern character for manifolds with boundary. Ryszard Nest, Department of Mathematics, University of Copenhagen, TBA. John Phillips, Department of Mathematics and Statistics, University of Victoria, Modular Index Theory of a Surprising Class of C^*-algebras with Unique KMS States. Ian Putnam, Department of Mathematics and Statistics, University of Victoria, Computing the K-theory of the Carey-Phillips-Rennie algebras and an excision result. Iain Raeburn, School of Mathematics and Statistics, University of Wollongong, Australia Phase transitions in a number-theoretic system. Jean Renault, Department of Mathematics, University of Orleans Gibbs measures as quasi-invariant measures. Adam Rennie, Mathematical Sciences Institute, Australian National University Index theory for KMS states. Fedor Sukochev, School of Mathematics, University of New South Wales Measures from Dixmier Traces and Zeta Functions. Yasuo Watatani, Department of Mathematical Sciences, Kyushu University, Japan, Fundamental group of simple C*-algebras with unique trace. Chen Yang, Newcastle upon Tyne, UK, Isopectral Deformation of the Eguchi-Hanson Space as a Nonunital Spectral Triple.

Links:
http://www.pims.math.ca/scientific/general-event/kms-states-and-non-commutative-geometry

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