

Subfactors and Fusion Categories

April 14-18, 2014

MEALS

*Breakfast (Buffet): 7:00–9:30 am, Sally Borden Building, Monday–Friday

*Lunch (Buffet): 11:30 am–1:30 pm, Sally Borden Building, Monday–Friday

*Dinner (Buffet): 5:30–7:30 pm, Sally Borden Building, Sunday–Thursday

Coffee Breaks: As per daily schedule, in the foyer of the TransCanada Pipeline Pavilion (TCPL)

***Please remember to scan your meal card at the host/hostess station in the dining room for each meal.**

MEETING ROOMS

All lectures will be held in the lecture theater in the TransCanada Pipelines Pavilion (TCPL). An LCD projector, a laptop, a document camera, and blackboards are available for presentations.

SCHEDULE

Sunday

- 16:00** Check-in begins (Front Desk - Professional Development Centre - open 24 hours)
17:30–19:30 Buffet Dinner, Sally Borden Building
20:00 Informal gathering in 2nd floor lounge, Corbett Hall (if desired)
Beverages and a small assortment of snacks are available on a cash honor system.

Monday

- 7:00–8:45** Breakfast
8:45–9:00 Introduction and Welcome by BIRS Station Manager, TCPL
9:00–10:00 David Evans
10:00 Coffee Break, TCPL
10:30–11:30 Terry Gannon
11:30–13:00 Lunch
13:00–14:00 Guided Tour of The Banff Centre; meet in the 2nd floor lounge, Corbett Hall
14:00 Group Photo; meet in foyer of TCPL (photograph will be taken outdoors so a jacket might be required).
14:00–14:30 Coffee Break, TCPL
14:30 - 15:30 Masaki Izumi
16:00 - 17:00 Pinhas Grossman
17:00 - 18:00 Discussion about problem solving sessions Tuesday + Thursday afternoons
17:30–19:30 Dinner

Tuesday

- 7:00–9:00** Breakfast
8:30–9:30 Peter Schauenburg
9:30–10:30 Eric Rowell
10:30–11:00 Coffee Break, TCPL
11:00–12:00 Small index subfactor discussion
11:30–13:30 Lunch
13:30–14:00 Problem solving session organization
14:00–17:00 Math! (Problem solving session)
15:00–15:30 Coffee Available, TCPL
17:00–18:00 Regroup and discussion
17:30–19:30 Dinner

Wednesday

7:00–9:00	Breakfast
8:30–9:30	Victor Ostrik
9:30–10:30	Zhengwei Liu
10:30–11:00	Coffee Break, TCPL
11:00–12:00	Zhengan Wang
11:30–13:30	Lunch
13:30–17:30	Free afternoon
15:00–15:30	Coffee Available, TCPL
17:30–19:30	Dinner

Thursday

7:00–9:00	Breakfast
8:30–9:30	Sonia Natale
9:30–10:30	Shlomo Gelaki
10:30–11:00	Coffee Break, TCPL
11:00–12:00	Yevgenia Kashina
11:30–13:30	Lunch
13:30–14:00	Problem solving session organization
14:00–17:00	Math! (Problem solving session)
15:00–15:30	Coffee Available, TCPL
17:00–18:00	Regroup and discussion
17:30–19:30	Dinner

Friday

7:00–9:00	Breakfast
9:00–10:00	Yasuyuki Kawahigashi
10:00–10:30	Coffee Break, TCPL
10:30–11:30	Alexei Davydov
11:30–13:30	Lunch
Checkout by	
12 noon.	

** 5-day workshop participants are welcome to use BIRS facilities (BIRS Coffee Lounge, TCPL and Reading Room) until 3 pm on Friday, although participants are still required to checkout of the guest rooms by 12 noon. **

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ABSTRACTS (in alphabetic order by speaker surname)

Speaker: **Alexei Davydov** (Ohio Universtiy)

Title: *Witt groups of modular categories*

Abstract: Modular categories (or non-degenerate braided fusion categories) can be thought of as generalisations of quadratic spaces. All essential features of the theory of quadratic spaces have analogues for modular categories. In particular it is possible to define Witt equivalence for modular categories. Witt classes form a group. This group is convenient for classifying modular categories.

Speaker: **David Evans** (Cardiff University)

Title: *Quantum Doubles of Quadratic Systems I*

Speaker: **Terry Gannon** (University of Alberta)

Title: *Quantum Doubles of Quadratic Systems II*

Speaker: **Shlomo Gelaki** (Technion-Israel Institute of Technology)

Title: *Tensor categories in characteristic p*

Speaker: **Pinhas Grossman** (University of New South Wales)

Title: *Small-index subfactors and representation theory of fusion categories*

Abstract: We will discuss how the representation theory of fusion categories can be applied to the study of standard invariants of subfactors by looking at several examples of small-index subfactors and their associated fusion categories.

In particular, we will describe some recent results on the structure of the fusion categories associated to the Asaeda-Haagerup subfactor. In addition to the two even parts of the Asaeda-Haagerup subfactor, there four other fusion categories in the same Morita equivalence class, three of which have automorphism groups of order 16 (as opposed to the two originally known categories, which have automorphism groups of orders 1 and 2). This is joint work with Masaki Izumi and Noah Snyder.

Speaker: **Masaki Izumi** (Kyoto University)

Title: *The classification of 3^n subfactors with odd n .*

Abstract: We show that 3^n subfactors with odd n are completely classified by the solutions of certain numerical equations defined on abelian groups of order n . For the proof, we use the Feit-Thompson theorem, formal codegrees, and Cuntz algebra endomorphisms. We also discuss the case of even n .

Speaker: **Yevgenia Kashina** (De Paul University)

Title: *Classification of Hopf algebras of small dimension*

Speaker: **Yasuyuki Kawahigashi** (University of Tokyo)

Title: *Full conformal field theories. tensor categories and subfactors*

Abstract: By solving a conjecture of Kong and Runkel on tensor categories, we establish a correspondence between maximal full conformal field theories which arise from generalized Longo-Rehren subfactors and Morita equivalence classes of certain subfactors.

I start with a general explanation on operator algebraic approach to conformal field theory. This is a joint work with M. Bischoff and R. Longo.

Speaker: **Zhengwei Liu** (Vanderbilt University)

Title: *Singly generated planar algebras*

Abstract: The classification of singly generated planar algebras was initiated by Bisch and Jones. Motivated by BMW, we expect to classify planar algebras generated by a 2-box with at most 15 dimensional 3-boxes, in particular singly generated Yang-Baxter relation planar algebras. We will give a complete classification of singly generated Yang-Baxter relation planar algebras. It involves three families of planar algebras, Fuss-Catalan, BMW, the subgroup E_{N+2} of quantum $SU(N)$. The third family is a new one-parameter family of subfactor planar algebras. We will show its skein theoretic construction. Its fixed point algebra under a $\mathbb{Z}/2\mathbb{Z}$ action gives a new family of 2-supertransitive subfactors.

Speaker: **Sonia Natale** (Universidad Nacional de Córdoba)

Title: *On the classification of integral fusion categories*

Abstract: In this talk we shall review some recent progress on the classification of integral fusion categories and integral braided and modular tensor categories.

Speaker: **Victor Ostrik** (University of Oregon)

Title: *Quantum subgroups of $SU(n)$*

Abstract: Quantum subgroup of a braided fusion category is a commutative semisimple algebra in this category. In the special case of the category associated with positive energy representations of the loop group of $SU(n)$ we get a notion of the quantum subgroup of $SU(n)$. In this talk I will review what is known about such subgroups following some ideas introduced by A. Ocneanu.

Speaker: **Eric Rowell** (Texas A&M)

Title: *Rank-Finiteness for Modular Categories*

Abstract: I will explain recent joint work with Bruillard, Ng and Wang in which we prove that there are finitely many modular categories of any given rank. Time permitting, I will discuss applications and generalizations.

Speaker: **Peter Schauenburg** (Université de Bourgogne)

Title: *Higher Frobenius-Schur indicators for pivotal categories*

Abstract: Frobenius-Schur indicators for representations of a finite group go back to the beginnings of group representation theory at the start of the 20th century. The indicators of degree 2 were first used by Frobenius and Schur to determine when a complex representation can be realized over the real numbers; higher indicators have a somewhat less striking interpretation in terms of counting n -th roots in a group. The indicators are invariants of a group representation, and therefore also yield invariants of the finite group in question (or rather of its category of representations). We will discuss the extensions of these invariants, obtained successively by various authors, to more general objects, passing from finite groups to semisimple Hopf and quasi-Hopf algebras and suitable tensor categories. Equivariant indicators (apparently not considered in classical group representation theory) introduce an object of the Drinfeld center as additional parameter, making the relation of higher indicators to the center more transparent, and extending the range of applications of Frobenius-Schur-type invariants to the theory of Hopf algebras and fusion categories.

Speaker: **Zhengan Wang** (Microsoft Station Q)

Title: *Quantum topology/algebra and quantum computing* Abstract: I will discuss applications of quantum topology/algebra to quantum computing.