SEMINAR
SCHOOL OF MATHEMATICS AND STATISTICS

DATE: 18 DECEMBER 2019

TITLE

An introduction to modular tensor categories

VENUE | TIME

Seminar Room I
03:30 –04:30 PM

SPEAKER

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ABSTRACT

Modular tensor categories were introduced by V. Turaev in 1992, but some aspects were anticipated earlier by K.-H. Rehren (1990) and G. Moore and N. Seiberg (1989). A modular tensor category (MTC) is a braided tensor category (e.g., the category of representations of a group) satisfying certain finiteness and nondegeneracy conditions. The strong finiteness axioms imposed on a MTC imply that the resulting theory is more algebraic than categorical in nature.

Modular tensor categories arise in several diverse areas such as quantum group theory, low-dimensional topology, vertex operator algebras, and conformal field theory. For example, MTCs give rise to invariants of closed oriented 3-manifolds and links in such manifolds.

In my talk, I will explain how every MTC gives rise to a representation of the modular group SL(2, Z), justifying the nomenclature "modular". I will also explain how every braided tensor category gives rise to representations of the braid group, justifying the nomenclature "braided". Throughout my talk, I will focus on examples, rather than precise definitions.

The kernel of the representation of SL(2, Z) arising from a MTC is known to be a congruence subgroup. Time permitting, I will describe my recent work in this direction, involving Drinfeld doubles of finite Abelian groups and dihedral groups.