MATHEMATICS DEPARTMENT
North Carolina State University

ALGEBRA SEMINAR

Thursday, April 28, 2005

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On the Structure of Braided, Semisimple Tensor Categories of Type BCD

ABSTRACT: The main motivation for studying tensor categories is their wide use in theoretical physics to study quantum mechanical systems. Braided tensor categories are used to model symmetries in such a system. They also play a significant role in knot theory and the topology of low-dimensional manifolds and the representation theory of quantum groups, Lie algebras, Kac–Moody algebras, and loop groups.

Unfortunately, no general structure theory of tensor categories exists even for nice (such as semisimple, rigid, braided) tensor categories. A relevant question to ask is to what extent the tensor product decomposition rules determine the morphisms in a semisimple tensor category. Motivated by applications for quantum groups, Kazhdan and Wenzl addressed this question for tensor categories whose tensor product rules are analogous to those of the category of finite dimensional representations of $U_q(SL(n))$. The (perhaps) surprising answer is that the tensor product rules determine the categorical structure and even the braiding almost entirely. In this talk, I will present an extension of these results to braided tensor categories similarly related to representations of orthogonal and symplectic quantum groups. I will also indicate future research directions toward a more general classification of braided, semisimple tensor categories.

2:35 - 3:25 pm   HA 330

Faculty and Students are invited to attend.