Algebra Seminar

Tensor Categories and Superalgebras

Speaker

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Abstract:

In this talk we will focus on three tensor categories over on a field of characteristic 3: the category $\operatorname{Rep} C_3$ of finite dimensional representations of the cyclic group of order 3, the Verlinde category Ver_3, and the category sVec of finite dimensional super vector spaces. In each of these categories, we can define the concept of an algebra. For example, an algebra in $\operatorname{Rep} C_3$ is equivalent to an ordinary algebra together with an automorphism of order 3, while an algebra in sVec is a superalgebra.

In characteristic 3, the category $\operatorname{Rep} C_3$ is not semisimple, but we can use the concept of semisimplification, introduced in 1999 by J.W. Barrett and B.W. Westbury, to define a new semisiple category (Ver_3) together with a functor S: $\mathrm{Rep}C_3 \to \mathrm{Ver}_3$ called the semisimplification functor. Moreover, Ver_3 is equivalent to the category of super vector spaces, so we can use this to construct a superalgebra starting from an algebra. This is similar to the idea used by A. Kannan to construct exceptional simple Lie superalgebras.

The main purpose of this talk will be to introduce a recipe to construct superalgebras from algebras with an automorphism of order 3. We will illustrate this by constructing one of the two non unital composition superalgebras (with non trivial odd part) starting from the split Cayley algebra and an automorphism of order 3. (Joint work with Alberto Elduque and Umut Sayin)