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Crossed modular categories and the Verlinde formula for twisted conformal blocks

It is well known that there is a close relationship between the notions of (untwisted) conformal blocks, modular functors, modular categories and the Verlinde formula. I will describe joint work with S. Mukhopadhyay which generalizes many of these classical ideas to the twisted set up.

Let G be a finite group. I will describe the notions of G -crossed modular functors and G -crossed modular categories and the relationship between them. Now consider a simple Lie algebra equipped with a G -action preserving a Borel sub-algebra and a positive integer level. We will see how the associated vector bundles of twisted conformal blocks allow us to define a G -crossed modular functor and the corresponding G -crossed modular category. Finally we apply these ideas to derive a twisted Verlinde formula that computes the ranks of the vector bundles of twisted conformal blocks.