

Elliptic cohomology via conformal field theories

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ABSTRACT

We shall discuss an approach to understanding the Hopkins-Miller cohomology theory TMF of "topological modular forms", the universal elliptic cohomology theory, in geometric/analytic terms. This is an ongoing joint project with Stephan Stolz which builds on ideas of Graeme Segal. He suggested two decades ago to consider certain (infinite dimensional) vector bundles over the loop space LX as cocycles for the elliptic cohomology of a space X . These bundles (and their "connection") can be viewed as conformal field theories, parametrized by X . We show that enhancing Segal's "elliptic objects" by certain bundles of von Neumann algebras and bimodules, one indeed gets a cohomology theory.