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String bordism invariants in dimension 3 from U(1)-valued TQFTs

Abstract

The third string bordism group is known to be $\mathbb{Z}/24\mathbb{Z}$. Using Waldorf's notion of a geometric string structure on a manifold, Bunke--Naumann and Redden have exhibited integral formulas involving the Chern-Weil form representative of the first Pontryagin class and the canonical 3-form of a geometric string structure that realize the isomorphism $Bord_3^{String} \to \mathbb{Z}/24\mathbb{Z}$ (these formulas have been recently rediscovered by Gaiotto--Johnson-Freyd--Witten). In the talk I will show how these formulas naturally emerge when one considers the U(1)-valued 3d TQFTs associated with the classifying stacks of Spin bundles with connection and of String bundles with geometric structure. Joint work with Eugenio Landi (arXiv:2209.12933).