

Kevin Walker

Low-dimensional G-bordism and G-modular TQFTs

Abstract

Let G denote a class of manifolds (such as SO (oriented), O (unoriented), $Spin$, $Pin+$, $Pin-$, manifolds with spin defects, etc.). We define a 2+1-dimensional G -modular TQFT to be one which lives on the boundary of a bordism-invariant 3+1-dimensional G -TQFT. Correspondingly, we define a G -modular tensor category to be a G -premodular category which leads to a bordism-invariant 3+1-dimensional TQFT. When $G = SO$, this reproduces the familiar Witten-Reshetikhin-Turaev TQFTs and corresponding modular tensor categories. For other examples of G , non-zero G -bordism groups in dimensions 4 or lower lead to interesting complications (anomalies, mapping class group extensions, obstructions to defining the G -modular theory on all G -manifolds).