

DEFENSE OF THE DOCTORAL DISSERTATION

DEPARTMENT OF MATHEMATICS

“Classifying Stable Invertible Topological Field Theories With Spin Structure”



Traci Warner

Friday, June 23, 2023

Time: 1:00 PM

Location: 258 Hurley Bldg.

Examination Committee:

Chris Schommer-Pries, Advisor

Mark Behrens

Stephan Stolz

Larry Taylor



Abstract:

An invertible topological field theory is a symmetric monoidal functor from the category of bordisms with a given tangential structure to the Picard subcategory of a target symmetric monoidal category. Generalizing the celebrated Galatius-Madsen-Tillman-Weiss theorem, a theorem of C. Schommer-Pries shows such field theories may be classified via computations in the stable homotopy category, namely the cohomology of connective covers of the Madsen-Tillman spectra associated with the choice of tangential structure. We classify all such extended and partially extended stable field theories with spin structure in dimensions up to $n = 6$. By taking values in a certain universal target spectrum and its connective covers, we broaden the choice of target categories from categories of n -vector spaces to include categories of n -super vector spaces and n -superalgebras, among others. The computations involve use of the Steenrod algebra, as well as what seems to be a novel use of the octahedral axiom of triangulated categories.