

Math/Phys Seminar

Speaker: Eric Samperton, Purdue University

Tues, Jan 23, 1:30 pm, BRNG 1255

Computing the TVBW 3-manifold invariants from Tambara-Yamagami categories

I'll give a quick intro to spherical fusion categories and the Turaev-Viro-Barrett-Westbury construction, which associates an invariant of oriented 3-dimensional manifolds to each such category (and more generally give rise to 3-dimensional topological quantum field theories). Some of the simplest spherical fusion categories are the so-called Tambara-Yamagami categories, which depend on the data of a finite abelian group  $A$ , a choice of isomorphism between  $A$  and its dual, and a sign  $+1$  or  $-1$ . Despite their fairly simple definition, these categories are known to give rise to TVBW invariants that are NP-hard to compute. I'll explain what this means, and then describe my recent work with Colleen Delaney and Clement Maria that establishes an efficient algorithm for computing these invariants on 3-manifolds with bounded first Betti number. As motivation, I will also say a few things about why such complexity/algorithm results are interesting in the context of 3-manifold topology and quantum computation.