1172-18-230 **Xingshan Cui**, **Paul Gustafson**, **Yang Qiu** and **Qing Zhang*** (zhan4169@purdue.edu), Mathematical Sciences Bldg, West Lafayette, IN 47906. *From torus bundles to particle-hole equivariantization.*

We continue the program of constructing (pre)modular categories from 3-manifolds first initiated by Cho-Gang-Kim using M theory in physics and then mathematically studied by Cui-Qiu-Wang. An important structure involved is a collection of certain $\mathrm{SL}(2,\mathbb{C})$ characters on a given manifold which serves as the simple object types in the corresponding category. Chern-Simons invariants and adjoint Reidemeister torsions play a key role in the construction, and they are related to topological twists and quantum dimensions, respectively, of simple objects. The modular S-matrix is computed from local operators and follows a trial-and-error procedure. It is currently unknown how to produce data beyond the modular S- and T-matrices. There are also a number of subtleties in the construction which remain to be solved. In this talk, we consider an infinite family of 3-manifolds, that is, torus bundles over the circle. We show that the modular data produced by such manifolds are realized by the $\mathbb{Z}_2$-equivariantization of certain pointed premodular categories. (Received August 30, 2021)