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Moduli spaces of principal 2-group bundles and a categorification of the Freed–Quinn line bundle

A 2-group is a categorified version of a group: a category with a multiplication operator, for which all group axioms hold up to natural isomorphism. Similarly, there is a notion of principal bundle for a 2-group. We define the moduli space of principal 2-group bundles, and prove that it is gives a 2-fibration over the moduli space of principal bundles for an ordinary group G. Moreover, when G is finite, this 2-fibration provides a categorification of the Freed–Quinn line bundle, a mapping class group equivariant line bundle arising in Dijkgraaf–Witten theory for the finite group G. This is joint work with Daniel Berwick-Evans, Laura Murray, Apurva Nakade, and Emma Phillips.