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Discrete Chern-Simons via 2-group bundles on elliptic curves

Freed-Quinn define a model for 2+1 Chern-Simons theory with a finite gauge group G by constructing a particular line bundle \mathcal{L} on the moduli space of flat principal G bundles over a genus g surface X . In this talk, I will explain their construction and then show that \mathcal{L} is naturally a 2-group bundle over X , where a 2-group can be thought of as a categorified version of a group with a weaker notion of associativity. Our results provide a concrete example of a mathematical physics phenomenon that can be most naturally described using higher categorical language. This talk is based on joint work with D. Berwick-Evans, E. Cliff, L. Murray, and E. Phillips.