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Principal 2-group bundles and applications

A 2-group is a categorical generalization of a group: it's a category with a multiplication operation which satisfies the usual group axioms only up to coherent isomorphisms. A smooth 2-group is a categorical generalization of a Lie group. I will define principal bundles for such a smooth 2-group, and provide classification results that allow us work concretely with explicit bicategories of 2-group bundles. I will discuss applications of these ideas to the study of string structures and to Chern-Simons theory (in progress). This talk is based on joint work with Dan Berwick-Evans, Laura Murray, Apurva Nakade, and Emma Phillips.