1046-55-597 **John C. Baez*** (baez@math.ucr.edu), Department of Mathematics, University of California, Riverside, CA 92521. *Classifying Spaces for Topological 2-Groups.*

Categorifying the concept of topological group, one obtains the notion of a topological 2-group. This in turn allows a theory of "principal 2-bundles" generalizing the usual theory of principal bundles. It is well-known that under mild conditions on a topological group $G$ and a space $M$, principal $G$-bundles over $M$ are classified by either the Čech cohomology $H^1(M, G)$ or the set of homotopy classes $[M, BG]$, where $BG$ is the classifying space of G. Here we review work by Bartels, Jurco, Baas-Bökstedt-Kro, Stevenson and myself generalizing this result to topological 2-groups. We explain various viewpoints on topological 2-groups and the Čech cohomology $H^1(M, \mathbf{G})$ with coefficients in a topological 2-group $\mathbf{G}$, also known as "nonabelian cohomology". Then we sketch a proof that under mild conditions on $M$ and $\mathbf{G}$ there is a bijection between $H^1(M, \mathbf{G})$ and $[M, B|\mathbf{G}|]$, where $B|\mathbf{G}|$ is the classifying space of the geometric realization of the nerve of $\mathbf{G}$. (Received September 08, 2008)