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Homotopy types of gauge groups over 4-manifolds

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Gauge groups originate from physics and they have many applications in physics and mathematics, for example Yang-Mills theory and the classification of 4-dimensional smooth manifolds. Given a Lie group G, a gauge group is defined to be the group of G-equivariant automorphisms of a principal G-bundle fixing its base manifold. In general gauge groups are difficult to calculate. In this talk, I will discuss a homotopy decomposition method and the homotopy types of gauge groups over certain non-simply connected 4-manifolds.