Homotopy types of gauge groups over high dimensional manifolds

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The homotopy types of gauge groups have been investigated by many experts in the latest twenty years. In particular, Kishimoto, Kono, Theriault, So and others have studied the gauge groups over 4-dimensional manifolds. In this talk, we will use So's decomposition methods to study the homotopy theory of gauge groups over higher dimensional manifolds. For instance, we will study the E-type gauge groups over $(n-1)$-connected $2n$-manifolds. We will further investigate other $2n$-manifolds and sphere bundles as well. A particular interesting case is about a family of 5-dimensional manifolds as the total spaces of S^1-principal bundles overs simply-connected four manifolds. We will give many homotopy decompositions of gauge groups under the mentioned cases.