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*Mod- $\ell$  homotopy type of the classifying space for commutativity*

The classifying space for commutativity, denoted by  $B_{\text{com}}G$ , of a Lie group  $G$  is assembled from commuting tuples in  $G$  as a subspace of the usual classifying space  $BG$ . The resulting space classifies principal  $G$ -bundles whose transition functions generate an abelian subgroup of  $G$  whenever they are simultaneously defined. The relationship between the homotopy type of  $G$  and the space  $B_{\text{com}}G$  is much more interesting, and non-trivial compared to the case of  $BG$ . In this talk, I will present a work, joint with Ben Williams, where we study the mod- $\ell$  homotopy type of  $B_{\text{com}}G$  at a prime  $\ell$ . The techniques involve a homotopy colimit decomposition over a topological category generalizing the construction of Adem-Gomez and application of results on mapping spaces between classifying spaces of compact Lie groups due to Dwyer-Wilkerson. We show that for a connected compact Lie group the mod- $\ell$  homotopy type of  $B_{\text{com}}G$  depends on the mod- $\ell$  homotopy type of  $BG$ .