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Metal-insulator transition revisited for cold atoms in non-Abelian gauge potentials DANIEL DAKIN, National Institute of Standards and Technology, INDUBALA SATIJA, National Institute of Standards and Technology & George Mason University — We investigate an analog to the metal-insulator transition that occurs in two-dimensional electron dynamics in a lattice and a perpendicular magnetic field. This localization transition is controlled by the ratio of the anisotropic coupling strengths. Recent theoretical work has demonstrated the ability to simulate this electronic system with cold atoms in an optical lattice using laser beams, allowing one to exploit the benefits of quantum control to study an otherwise difficult strongly correlated condensed matter problem. With extensions to this work, it is possible to create artificial gauge potentials that transform under non-Abelian gauge groups. We study the localization phase transition in the context of cold atoms in an optical lattice under the influence of non-Abelian gauge potentials.

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