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Exploring Ultracold Atoms in Non-Abelian Gauge Potentials J.Y. VAISHNAV, National Institute of Standards and Technology, I.I. SATIJA, National Institute of Standards and Technology and George Mason University, C.W. CLARK, National Institute of Standards and Technology — The motion of ultracold, multi-level atoms in spatially varying laser fields can generate non-Abelian gauge potentials, if two or more of the dressed states are degenerate. We examine the spectral and other exotic characteristics of ultracold atoms moving in such non-Abelian gauge potentials, with a view to understanding phenomena like symmetry breaking and non-Abelian Berry phase. Our work is motivated by numerous proposals to create non-Abelian gauge fields in cold atom experiments.

Jay Vaishnav
National Institute of Standards and Technology

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