Abstract Submitted
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Rashba spin-orbit coupling for neutral atoms[1] DANIEL CAMPBELL, JQI and University of Maryland, GEDIMINAS JUZELIŪNAS, Institute of Theoretical Physics and Astronomy and Vilnius University, IAN SPIELMAN, JQI, NIST and University of Maryland — We theoretically describe a new class of atom-laser coupling schemes which lead to effective spin-orbit coupled Hamiltonians for ultra-cold neutral atoms. By properly setting the optical phases, a pair of degenerate spin states emerge as the lowest energy states in the spectrum, and are thus immune to collisionally induced decay. These schemes use N cyclically coupled ground or metastable internal states but we will specialize to the four-level case for this talk. Time permitting, we will describe a possible implementation of this scheme for ^{87}Rb that adds a controllable Dresselhaus component to the effective Hamiltonian in a natural way.

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