

Abstract Submitted  
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**Experimental progress towards non-abelian spin-orbit coupling of neutral ultracold bosons**<sup>1</sup> DANIEL CAMPBELL, RYAN PRICE, ANDIKA PUTRA, ANA VALDÉS CURIEL, JQI, University of Maryland at College Park, IAN SPIELMAN, JQI, University of Maryland at College Park and NIST — Spin-orbit coupling can be created in ultracold gases by linking a change in state to a change in momentum, for example using Raman transitions. When two or more eigenstates of the spin-orbit coupling interaction are degenerate, a geometric phase associated with a closed loop in momentum may exist. Rashba spin-orbit coupling (present for free electrons in the presence of a uniform electric field, such as in asymmetric semiconductor heterostructures), is perhaps the simplest of these 2D spin-orbit couplings associated with a non-trivial geometric phase. To date it has not been realized in ultracold neutral gases. We will discuss experimental progress toward realizing Rashba spin-orbit coupling in ultracold <sup>87</sup>Rb gases.

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