

Abstract Submitted
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Transport behaviors of BEC in synthetic spin-orbit and gauge fields ROBERT NIFFENEGGER, CHUAN-HSUN LI, ABRAHAM OLSON, YONG P. CHEN, Purdue University — We experimentally study transport of Bose Einstein Condensates (BECs) with synthetic gauge fields and spin-orbit coupling (SOC), created by counter propagating Raman lasers which couple hyperfine spin and momentum states of ^{87}Rb and generate a synthetic dressed bandstructure modifying atoms' kinetic energy-momentum dispersion. We have developed various techniques to actuate and control the transport with synthetic electric fields and spin-dependent fields, as well as by gravity (the direction of our spin-momentum coupling) and far off resonance lasers. We study the time evolution of the momentum, spin and density (measured after time-of-flight) of BEC during transport in the dressed bands, both with and without the optical trap.

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