Abstract Submitted
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Spin-orbit coupled Bose-Einstein condensates with lattice-band pseudospins[1] PETER ENGELS, M. A. KHAMEHCHI, Washington State University, CHUNLEI QU[2], University of Texas at Dallas, MAREN MOSSMAN, Washington State University, CHUANWEI ZHANG, University of Texas at Dallas — Dilute-gas Bose-Einstein Condensates provide a flexible platform to model a wide variety of condensed matter phenomena. To this goal, dressing atoms with suitably tailored laser beams is a premier tool and can be used to generate spin-orbit coupling, artificial gauge fields, and lattice structures. In this talk, a set of recent and ongoing experiments conducted at Washington State University will be described in which we apply both static and moving optical lattices to form Floquet-Bloch states. The s-band and the px-band of the static lattice are considered pseudospins, and it is shown that spin-orbit coupling can be introduced between such lattice band pseudospins. The notion of lattice band pseudospins provides a new viewpoint for quantum gas experiments that may pave the way for engineering novel quantum matter using hybrid orbital bands.

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