

Abstract Submitted  
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**Atomic Four-Wave Mixing with Two-Component Matter Waves<sup>1</sup>**

DANIEL PERTOT, BRYCE GADWAY, DOMINIK SCHNEBLE, Stony Brook University — We report on a novel type of atomic four-wave mixing occurring in a two-component Bose–Einstein condensate. Seed and pump modes differing both in momentum and internal state are prepared via state-selective Kapitza–Dirac diffraction from a one-dimensional optical lattice. We find the initially empty output modes to be populated through a collinear four-wave mixing process involving both internal states, in excellent agreement with simulations based on a coupled-mode expansion of the Gross–Pitaevskii equation. We show how such four-wave mixing can affect studies of bosonic mixtures loaded into optical lattices, and we discuss possible applications in the context of quantum atom optics.

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Daniel Pertot  
Stony Brook University

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