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Optically induced hydrodynamics in a spin-orbit-coupled Bose-Einstein condensate[1] MAREN MOSSMAN, PETER ENGELS, Washington State University — The ability to coherently couple spin and momentum in a cold atom system via spin-orbit coupling has established a platform for novel Bose gas experiments. A key feature of spin-orbit coupling is the breaking of Galilean invariance in the system. Using an elongated Bose-Einstein condensate, we experimentally probe the hydrodynamic properties and excitations of this system by applying optical potentials such as localized barriers or potential dips. The experiments provide insight into the nonlinear excitation spectrum of the system and also have possible implications for applications in atomtronics and spintronics. The current status and future directions of this work are discussed.

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Maren Mossman
Washington State University

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