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Engineered dispersions in Spin-Orbit Coupled BECs[1] EDWARD DELIKATNY, MICHAEL FORBES, PETER PETER ENGELS, MAREN MOSSMAN, Washington State Univ — Spin-Orbit Coupling (SOC) allows for a great deal of control over BECs. Using tunable dispersions we explore the effects of negative effective mass on commonly seen phenomenon like solitons, shockwaves, and phonons. By tuning the SOC parameters and initial cloud density in a tube geometry, one can control the formation, motion, and effective mass of phonons. We generate larger and larger phonons that lie outside of the linear regime using an optical bucket and compare their measured velocities to theory. We extend this work to investigate the generation and motion of solitons in a tube with spatially varying effective-detuning. This work is supported by the National Science Foundation under Grant No. 1707691.

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