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Quantum Transport of a Bose Einstein Condensate HRISHIKESH KELKAR, BRAULIO GUTIERREZ-MEDINA, KEVIN HENDERSON, MARK RAIZEN, Center for Nonlinear Dynamics and Department of Physics, University of Texas at Austin — We report progress on experiments to study many-body quantum transport and dynamics in one-dimensional potentials. Our system consists of a Bose-Einstein Condensate (BEC) of sodium atoms confined to a hybrid magnetic/optical trap. Transverse confinement is provided by a 2-D axially symmetric magnetic trap with a trap frequency of 317 Hz. The BEC is confined axially by a focused YAG laser beam, or by two focused spots that are separated by a controlled distance, creating an optical box. The atoms are then released into an optical potential along the axial direction that is created by an array of far detuned laser spots. Each spot can be independently controlled both in position and power, with a spatial resolution of 6μm. This potential can be combined with a standing wave that is aligned along the trap axis, enabling transport measurements in potentials that can range from periodic to disordered.

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