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Observation of quantum accelerator modes in Rb atoms VIJAYASHANKAR RAMAREDDY, Oklahoma State University, BRIAN TIMMONS, GHAZAL BEHIN-AEIN, PEYMAN AHMADI, GIL SUMMY — We report the observation of Quantum Accelerator Modes (QAM) for cold Rb-87 atoms. Quantum accelerator modes are produced by the diffraction of atomic De Broglie waves. When a standing light wave which acts as a thin phase grating is produced, a group of atoms that have certain initial velocity gets accelerated. The momentum gained by these atoms scales linearly with the number of kicks. Gravity plays an important role in QAM through the phase evolution of the De Broglie wave between any two kicks. QAM can be used in the study of quantum chaos and atom optics.

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