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Progress toward observation of quantum interference of currents in an Atom SQUID CHANGHYUN RYU, E. CARLO SAMSON, MALCOLM BOSHIER, Los Alamos National Laboratory — Quantum interference of currents was first observed in a superconducting loop with two Josephson junctions, leading to the name SQUID for this device. This interference effect has been used to develop extremely sensitive magnetometers. The Atom SQUID, an analogous device based on ultracold atoms, has been developed recently to study SQUID physics in a device offering a better understanding of the underlying microscopic dynamics. Although many exciting experiments have been done with Atom SQUIDs, the quantum interference of currents has not yet been observed. In analogy with the SQUID magnetometer, it should be possible to use the quantum interference effect in an Atom SQUID to measure rotation, which may lead to the development of a sensitive gyroscope. In a previous experiment, we showed Josephson effects with an atom SQUID by observing the change from the dc Josephson regime to the ac Josephson regime by measurement of the critical atom number for this transition. Quantum interference should cause this critical atom number to vary with rotation rate. We have simulated this system with the Gross-Pitaevski Equation and found the expected oscillatory change of the critical atom number. We will present this simulation result and report the current status of our experiment to

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