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Driving phase slips in an annular Bose-Einstein condensate with a rotating weak link KEVIN C. WRIGHT, R.B. BLAKESTAD, Joint Quantum Institute, NIST, University of Maryland, C.J. LOBB, University of Maryland, Department of Physics, W.D. PHILLIPS, G.K. CAMPBELL, Joint Quantum Institute, NIST, University of Maryland — We have created a toroidal atomic Bose Einstein condensate, stirred by a rotating barrier potential which creates a weak link. Varying the rotation rate and critical current of the weak link, we observe two main regimes of behavior. At low rotation rates, and small critical current, we observe phase slips between well-defined persistent current states. At higher rotation rates, vortices penetrate into the bulk of the condensate, and discrete phase slips between well-defined persistent current states no longer occur. The response of the condensate can be compared to that of superconducting ring with a weak link in an external magnetic field.

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