

Abstract Submitted  
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**Adiabatically tuning quantized supercurrents and superfluid hysteresis in spin-orbit coupled Bose-Einstein condensates** JUNPENG HOU, XIWANG LUO, KUEI SUN, CHUANWEI ZHANG, Department of Physics, The University of Texas at Dallas — The ability to generate and manipulate quantized persistent currents is crucial for building atomtronic devices with novel functionality. Previous schemes for generating quantized supercurrents, such as rotating laser barriers, rely on dynamical process and thus are not accurate and stable. Here we show that arbitrary quantized circulation states can be adiabatically prepared and tuned as the ground state of a BEC confined on a ring by utilizing spin-orbital angular momentum coupling and an external trapping potential. We show that there exists superfluid hysteresis for the process of tuning supercurrents between different quantization values. Our work provides a powerful platform for building and exploring novel superfluid atomtronic circuits.

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