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Generation and pinning of high winding-number vortices in Bose-Einstein condensates¹ E. CARLO SAMSON, KALI WILSON, ZACHARY NEWMAN, EWAN WRIGHT, BRIAN P. ANDERSON, University of Arizona — We demonstrate the creation of pinned vortices with high winding number (up to 11) in Bose-Einstein condensates (BECs) held in high oblate traps. In our method, a pancake-shaped BEC is initially produced in a combined magnetic and optical trap. Using time-varying magnetic fields to translate the location of the BEC with respect to a focused blue-detuned laser beam, we allow the BEC to spiral around the optical barrier until the barrier ends up at the BEC center. We explore the variation of the net winding of the pinned vortices with the duration of spiral trajectory. This procedure may be scaled to larger numbers of pinned vortices and will be useful in studies of superfluid dynamics and vortex interactions.

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