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Construction and characterization of tapered nano-fibers for hybrid quantum systems J.E. HOFFMAN, J.A. GROVER, Z. KIM, J. LEE, K.D. VOIGT, I.D. SCHOCH, A.K. WOOD, J.R. ANDERSON, M. HAFEZI, C.J. LOBB, L.A. OROZCO, S.L. ROLSTON, J.M. TAYLOR, F.C. WELLSTOOD, Joint Quantum Institute, Dept. of Physics, UMD and NIST, College Park, MD 20742, USA, S. RAVETS, Laboratoire Charles Fabry, Institut d'Optique, CNRS Univ Paris-Sud, Campus Polytechnique, RD 128, 91127 Palaiseau cedex, France — Nanofibers are a promising tool for hybrid systems of atomtronics and quantum information. We present the construction and characterization protocol that allows us to reliably produce nanofibers with a waist up to 10 cm in length and down to 500 nm in diameter operating around 780 nm (Rb D2 line). By controlling the angle in the tapered region at chosen radii, we can excite higher order modes in the fiber and observe their beating while monitoring the transmission during the pull. To reach the adiabatic regime, thus minimizing transmission losses in the fiber, we can reduce the taper angle in the critical excitation regions. Using this technique we can minimize the length of our taper region for given loss constraints.

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