Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Metal-Insulator-Metal Nanocoaxial Waveguides by Atomic Layer Deposition (ALD)[1] Y. M. CALM, J. M. MERLO, B. E. CARTER, M. J. BURNS, K. KEMPA, M. J. NAUGHTON, Boston College — The nanocoaxial waveguide has demonstrated subwavelength confinement and routing of visible[2] and NIR[3] light. Confinement in a nanophotonic waveguide is achieved by choice in geometry and in materials. Our interest in the coaxial geometry is two-fold: first, the fabrication is relatively straightforward; and second, the fundamental mode has no cutoff, admitting the possibility of extreme confinement (given suitable materials). Our metal and insulator layers, grown by ALD, are Pt and Al_2O_3, respectively, and we leverage the *conformal* nature of ALD to produce high aspect ratio nanocoaxes, which we have fabricated both in the plane (i.e. horizontal) and normal to the plane (i.e. vertical) of the substrate using electron beam lithography. We perform optical transmission measurements with our customized microscopes (widefield and nearfield scanning), and we characterize these structures further with various forms of metrology and other microscopies. Experimental and computational progress towards increasing the coupling efficiency between radiation and guided modes is discussed.

[1]This work is supported by the W. M. Keck Foundation.
[2]J. Rybczynski *et al.*, *Appl. Phys. Lett.* **90**, 021104 (2007)
[3]J. M. Merlo *et al.*, *Opt. Expr.* **22**, 14148 (2014)

Yitzi Calm
Boston College

Date submitted: 11 Nov 2016 Electronic form version 1.4