Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Wireless transmission by plasmonic antennas JUAN M MERLO, YITZI M. CALM, AARON H. ROSE, MICHAEL J. BURNS, MICHAEL J. NAUGHTON, Boston College — Radio frequency (RF) communication is fundamental to many modern technologies. The idea of a simple rescaling of RF theory to the visible frequency range is not a direct issue [1,2], due in part to the finite conductivity in the optical range of commonly-used metals (e.g. Ag, Au). In this context, wireless communication using plasmonic antennas is a very recent concept with potential importance in an on-chip technology application. Here, we propose a plasmonic antenna system capable of wireless transmission-at-a-distance equivalent to at least four free-space wavelengths from the emitter. We demonstrate that it is possible to transmit information with maximum signal strength of -6.9 dB at three free-space wavelengths with a signal-to-noise ratio of -13 dB, good enough to be considered as an efficient wireless system. Theoretical calculations agree with our experimental results and open the possibility to future optimizations of the proposed plasmonic wireless system. [1] Y. Wang, K. Kempa, B. Kimball, J. B. Carlson, G. Benham, W. Z. Li, T. Kempa, J. Rybczynski, A. Herczynski, Appl. Phys. Lett. 85, 2607 (2004). [2] L. Novotny, Phys. Rev. Lett. 98, 266802 (2007).

Juan M. Merlo
Boston College

Date submitted: 05 Nov 2015 Electronic form version 1.4