

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Experimental observation of TM propagated modes in nanocoax structures**<sup>1</sup> MICHAEL J. NAUGHTON, BINOD RIZAL, FAN YE, MICHAEL J. BURNS, JUAN M. MERLO, Department of Physics, Boston College — The nanoscale manipulation of light has become one of the most important research areas in the last years.<sup>2</sup> Several studies in nanoscale waveguides have been done and the coaxial waveguide is among the most promising due to its broadband properties.<sup>3</sup> Here, we report the experimental observation of photonic and plasmonic transverse magnetic mode propagation in a nanocoax structure by use of leakage radiation microscopy and near-field scanning optical microscopy in the visible and near-infrared ranges of the electromagnetic spectrum. Numerical calculations are consistent with our experimental results and suggest that the propagated modes are mainly  $TM_{10}$ -like (plasmonic) and  $TM_{11}$  (photonic) modes, confirming theoretical results previously reported.<sup>4</sup>

<sup>1</sup>This work is supported by the W. M. Keck Foundation.

<sup>2</sup>R. R. Oulton, V. J. Sorger, T. Zentgraf, R. M. Ma, C. Gladden, L. Dai, G. Bartal, X. Zhang, *Nature* 461, 629-632 (2009).

<sup>3</sup>D. Pozar, D. "Microwave Engineering," 3rd. Edition. John Wiley and Sons, Inc. USA, 2005.

<sup>4</sup>Peng Y., Wang W., Kempa K., *Opt. Express.* 3, 1758-1763 (2008).

Juan Merlo  
Department of Physics, Boston College

Date submitted: 14 Nov 2013

Electronic form version 1.4