Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

A Multi-Mode Hybrid Plasmonic Waveguide with Enhanced Confinement and Propagation[1] JOHN COLANDUONI, DANIEL NIKOLOV, HUIZHONG XU, St. John's Univ — Waveguides capable of achieving high confinement with low loss are a key goal in the developing field of plasmonics. A hybrid waveguide, which consists of a dielectric wire above a dielectric-metal interface, has been previously proposed with such desirable properties. By exciting this geometry with an aperture in the metal that takes advantage of the extraordinary transmission through sub-wavelength apertures, it is possible to strongly couple to multiple modes. The real part of the fundamental mode is in fact capable of exceeding the index of refraction of all the materials used while maintaining a small imaginary part, as a result of appropriate choice of materials for the dielectric wire and the metal. As the amplitude of the most confined mode is significantly larger than the amplitude of the other modes with poor confinement, this geometry can enable enhanced confinement and propagation in light guiding applications.

[1]This research was supported by the Seed Grant Program of St. John's University and the National Science Foundation under grant No. CBET-0953645.

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Date submitted: 15 Nov 2013 Electronic form version 1.4