

Abstract Submitted
for the 4CF09 Meeting of
The American Physical Society

Hybrid plasmon/dielectric waveguide for integrated silicon-on-insulator optical elements¹ JONATHAN BANKS, DAVID FLAMMER, CHARLES DURFEE, TOM FURTAK, REUBEN COLLINS, Department of Physics, Colorado School of Mines, RUSSELL HOLLINGSWORTH, ITN Energy Systems, Inc. — We present a hybrid plasmon/dielectric single-mode single-polarization waveguide on silicon-on-insulator wafers. The structure is fabricable using VLSI processing techniques and minimizes losses due to surface roughness and metallic losses. Because only a single mode and single polarization is admitted, birefringent effects are eliminated. Both simulations and experimental verification of the modes are presented. Simulations show the waveguide can be tuned for either very long propagation lengths or sub-wavelength confinement by changing a patterned metal line width and oxide thickness, which are easily done with VLSI methods. Simulations show sub-wavelength confinement modes with propagation lengths greater than 100 microns, and micron-scale confinement modes with 7mm propagation lengths. This structure naturally forms an MOS capacitor that may be used for active device integration.

¹We gratefully acknowledge financial support from the Air Force Office of Scientific Research, Award # FA9550-06-1-0548.

Jonathan Banks
Department of Physics, Colorado School of Mines

Date submitted: 28 Sep 2009

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