

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Metal-less Plasmonics: Surface Electromagnetic Waves in Dielectric Multilayers WILLIAM ROBERTSON, Department of Physics & Astronomy and Computational Science Program, Middle Tennessee State University — The use of suitably designed dielectric multilayers is demonstrated as an alternative to metal films for the generation of surface-bound electromagnetic waves. The growing field of plasmonics invokes the sub-wavelength resolution, resonant optical coupling, and high surface fields of surface plasmons for applications such as high-resolution lithography, biosensing, optical circuits, and enhanced non-linear optic phenomena. Surface electromagnetic waves with characteristics similar to surface plasmons can be generated in dielectric multilayer stacks. The dielectric loss in multilayers is much less than for surface plasmons in metal films leading to sharper coupling resonances, higher surface fields, and longer propagation distances than for surface plasmons. These features are advantageous for current and projected applications in plasmonics. Additionally, the wavelength of coupling and the dispersion of the surface electromagnetic waves can be engineered by the multilayer design. Examples of the use of surface electromagnetic waves in multilayers for bio-sensing will be presented.

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Date submitted: 21 Nov 2010

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