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Kyle Shaw* (kshaw11@masonlive.gmu.edu), 254 Briarwood Drive, Elverson, PA 19520, and
Dan Weingarten (dweingar@gmu.edu), 5932 Bangor Drive, Alexandria, VA 22303. *Optimizing
Surface Plasmon Generation.*

Surface Plasmon Resonance (SPR) is a collective oscillation of traveling charge density waves present at the interface of two media (metal-dielectric). Our project focuses on developing an optimization algorithm for finding geometric parameters of the grating nanodevice that provide the most efficient conversion of energy between the Gaussian beam and the SPR modes. The optimization algorithm is based on iterative solving of Maxwell's equations by the finite element method. The developed technique will allow control of the electromagnetic field below the wavelength. This results in applications ranging from computer chip enhancements to more powerful lenses all the way to the extreme case of cloaking at the nano level. (Received September 25, 2012)