Contents

1 Waveguide Film

Following [1], the solution to 50 nm Si waveguide modes with SiO_2 on both sides is.

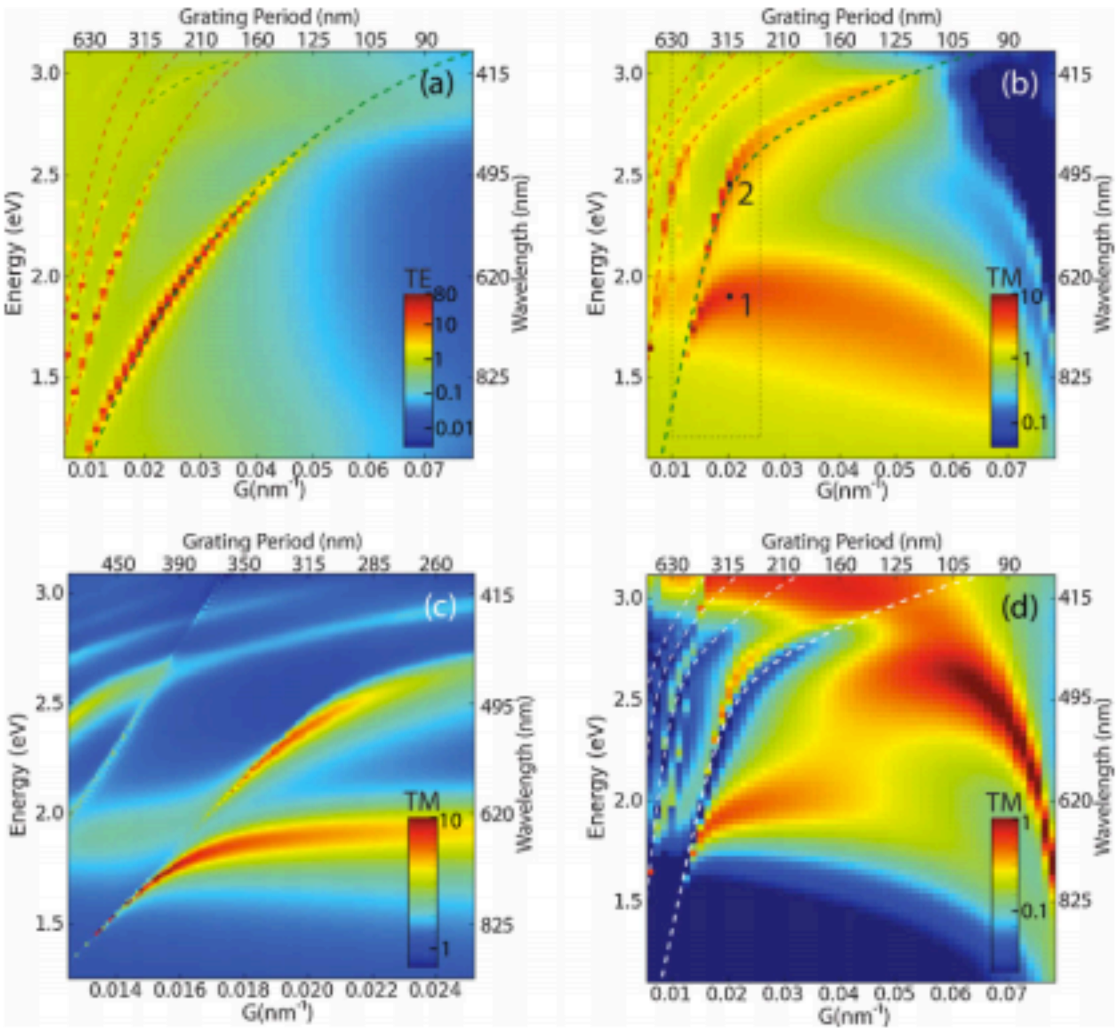

Figure 2. a) Map of the absorption enhancements in a 50 nm thick Si film versus the incident photon energy and reciprocal lattice vector of the strip-array for TE illumination. The green dashed lines correspond to analytical solutions for the first and second order TE modes. Red lines represent the first order mode repeating itself at higher periods. b) Similar map as (a), but now for TM polarization. c) An enlarged image of the dashed region in (b), showing the strong coupling of the Si waveguide and localized strip modes. d) Map of the fraction of the incident power that is absorbed by the metallic strips (1 corresponds to 100% metal absorption). All of the color bars are on logarithmic scale to the base 10.

Using our Matlab code, `Pala.m`, we can replicate the curves

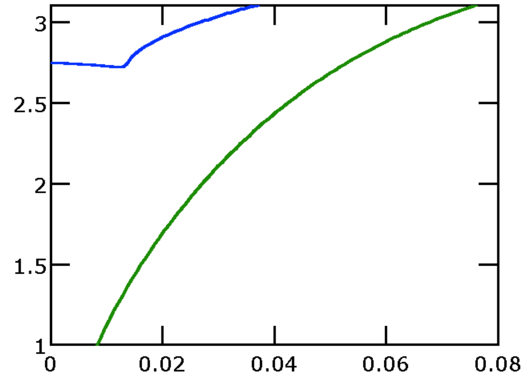

Figure 1: TE modes

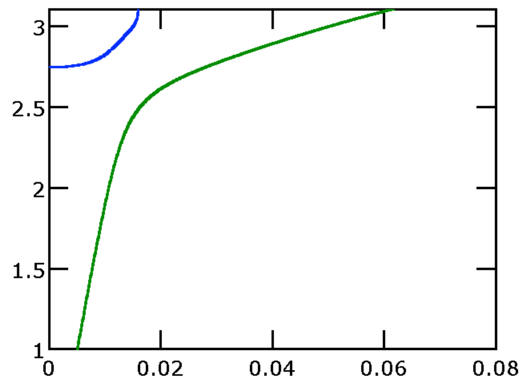

Figure 2: TM modes

References

[1] R. A. Pala, J. White, E. Barnard, J. Liu, and M. L. Brongersma, "Design of plasmonic thin-film solar cells with broadband absorption enhancements," *Advanced Materials*, vol. 21, no. 34, pp. 3504–3509, Sep. 2009. [Online]. Available: http://onlinelibrary.wiley.com/doi/10.1002/adma.200900331/abstract