

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Optical response of structured noble-metal nanoparticle aggregates¹ JUN JUN XIAO, Dept. of Physics, The Chinese Univ. of Hong Kong and Dept. of Physics, Univ. of Toronto, K. W. YU, Dept. of Physics, The Chinese Univ. of Hong Kong — Interactions of light with subwavelength structures open new avenues of controlling light for many applications. The optical responses of structured array of noble-metal nanoparticle aggregates immersed in a glass matrix are investigated theoretically, motivated by the recent experimental observation of the splitting of the surface plasmon bands in silver arrays. To capture the strong electromagnetic coupling between the approaching particles in a silver aggregate, the spectral representation of the multiple image formula has been used, and a semiclassical description of the silver dielectric function is adopted from the literature [1]. The splitting of plasmon resonance band of the incident longitudinal and transverse polarized light is found to be strongly dependent on the particle diameter and their separation. Our results are shown in accord with the recent experimental observation. Moreover, a large redshift for the longitudinal polarization can be reproduced. The reflectivity spectrum is further calculated for a dilute suspension of dimer and chain arrays.

[1] J. J. Xiao, J. P. Huang, K. W. Yu, Phys. Rev. B, in press.

¹Work supported by RGC Earmarked Grant

Jun Jun Xiao
The Chinese University of Hong Kong

Date submitted: 01 Dec 2004

Electronic form version 1.4