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Splitting of Surface Plasmon Frequencies of Metal Nanoparticles by a Liquid-Crystal Coating[1] DAVID STROUD, Dep't of Physics, Ohio State Univ., SUNG YONG PARK, Dep't of Chemistry, Northwestern Univ. — When a small metal particle is coated with a nematic liquid crystal (NLC), the surface plasmon absorption peak splits into two peaks because of the coating anisotropy[1]. We have calculated this splitting using two different theoretical approaches. In the first, we assume the NLC director is uniformly oriented within the coating, and compute the splitting using a generalized Maxwell-Garnett approximation[2]. In the second approach, we calculate the extinction coefficient using the Discrete Dipole Approximation[3]. In this case, we consider three different director configurations in the NLC coating: uniform; "boojum" (singularities at the north and south poles); and "baseball" (four singularities arranged on a tetrahedron). Of the three, the splitting is largest for the boojum configuration. For realistic coating thicknesses, the calculated splitting is about 0.022eV, quite close to the observed value[3] of 0.030eV. We will also describe possible changes in the splitting under an applied dc electric field. [1] J. Muller et al, Appl. Phys. Lett. 81, 171 (2002. [2] Sung Yong Park and D. Stroud, Appl. Phys. Lett. 85, 2920 (2004). [3] B. T. Draine and P. J. Flatau, Opt. Lett. 16, 1198 (1991).

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