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Phonon-induced Anisotropy in Dispersion Forces on a Metallic Substrate JE-LUEN LI, Academia Sinica — It is known that surfactant micelles spontaneously adsorb on gold (111) surfaces with orientational order dictated by the gold crystal structure. All this happens despite the screening effects of delocalized electron clouds in metallic systems. To understand the van der Waals forces that provide organization on metallic substrates, we describe a formalism wherein the dielectric response acquires directional dependence through phonon dispersion relations related to the crystal structure. In metals, ionic screening is enhanced along certain directions and a crystalline metallic substrate generates both torque and attraction on geometrically asymmetric objects. Numerical calculations show that the anisotropic van der Waals force will orient a dielectric rod-like micelle on a gold (111) surface.

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