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Liquid Crystalline Orientational Control via the Electric Field of Localized Surface Plasmons[1] MAKIKO QUINT, University of California Merced — Collective oscillation of the electrons in gold nanoparticles (localized surface plasmon resonance (LSPR)) can produce a net electric field when excited at a resonant frequency. We have investigated the effects of LSPR-induced electric fields around self-assembled 30nm gold nanoparticles (AuNPs) on a thin film of nematic liquid crystal. Such a device configuration has the potential to act as an optically excited liquid crystal switch. We reversibly switch the spatial orientation of nematic liquid crystal molecules from homeotropic to planar in the thin films, demonstrating the action of this new device mode. We present electric field simulations for the system and control measurements for off-resonance excitation in which the switching behavior is not observed. Using polarized microscopy and optical transmission measurements, we observe switching over a temperature range starting several degrees below and up to the isotropic transition.

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