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Active Control of Propagating Surface Plasmons Excited by a Quantum Cascade Laser[1] DANIEL WASSERMAN, TROY RIBAUDO, UMass Lowell, ERIC SHANER, Sandia National Labs, SCOTT HOWARD, Cornell University, FOW-SEN CHOA, University of Maryland Baltimore County, CLAIRE GMACHL, Princeton University — There has been significant interest, of late, in the optical properties of subwavelength features in metallic films. For instance, resonant transmission through periodic arrays of subwavelength apertures in metallic films is seen at wavelengths determined by the periodicity of the metal film and the relative permittivity of the metal and the surrounding dielectric medium. This phenomenon is referred to as extraordinary optical transmission (EOT) and has been studied for potential applications in display and sensing technologies. Here we demonstrate the ability of an actively tunable EOT grating to control the coupling of incident coherent radiation from a dual wavelength QCL to propagating surface modes on the grating. We use a novel spatially and spectrally resolved Fourier transform infrared spectroscopy technique to image the propagating surface waves on our EOT grating, and are able to extract a plasmon propagation length from the data collected.

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