Abstract Submitted
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Polarized Infrared Response of Subband Transitions in High Density 2DEG in $GdTiO_3/SrTiO_3$ Interfaces[1] BILL FLAHERTY, DANIEL OUELLETTE, POUYA MOETAKEF, CLAYTON JACKSON, SUSANNE STEMMER, S. JAMES ALLEN, UC Santa Barbara, EXEDE MURI TEAM[2] — The 2-D electron gas at the interface between $GdTiO_3$ and $SrTiO_3$ layers has an electron density comparable to 3.4 x 10^{14} cm^{-2} per interface with potential applications for tunable plasmonic devices. Experiments are currently underway to measure the infrared response of this electron gas, with infrared electric fields perpendicular to the interface as well as parallel. The former may provide insight into the electric subband states. Using angle-resolved Fourier transform infrared spectroscopy with s- and p-polarized beams, we can compare the in- and out-of-plane response of the 2DEG. Normalizing it against the response of the bare substrate will allow us to extract the 2DEG contribution. These results will be compared to those predicted by Park and Millis, Phys. Rev. B87, 205145 (2013). Results to date display in-plane but little out-of-plane response. We will look at various GTO/STO interfaces, such as single interfaces and superlattices of alternating layers.

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[2]Extreme Electron Concentration Oxide Devices

Bill Flaherty
University of California, Santa Barbara

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