Abstract Submitted
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Extreme high-density electron gas using band engineered complex oxide interfaces[1] PENG ANDREW XU, Univ of Minn - Minneapolis, TIMOTHY C. DROUBAY, Pacific Northwest National Laboratory, JONG SEOK JEONG, Univ of Minn - Minneapolis, SCOTT A. CHAMBERS, Pacific Northwest National Laboratory, ANDRE K. MKHOYAN, BHARAT JALAN, Univ of Minn - Minneapolis — The study of interfaces between polar and non-polar complex oxides has seen unprecedented growth due to their unique ability to display interface-stabilized ground states including high-density two-dimensional electron gas (equivalent to 0.5 electron/u.c./interface). In this talk, we will present detailed thickness dependent structural and electronic transport study of the MBE-grown $NdTiO_3/SrTiO_3$ and $SrTiO_3/NdTiO_3/SrTiO_3$ heterostructures. High-resolution x-ray diffraction, atomic force microscopy, reflection high-energy electron diffraction, scanning transmission electron microscopy and different spectroscopy techniques reveal nearly stoichiometric composition and abrupt interfaces. We will review the long-standing question on the origin of carriers at these interfaces and will present novel routes to achieve carrier density in excess of 0.5 electron/unit cell/interface using band engineered oxide interfaces.

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