Title of Project: Functional oxide thin films

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Short Description

The aberration-corrected scanning transmission electron microscope (AC-STEM) can provide real space imaging and spectroscopy at atomic resolution with a new level of sensitivity to structure, bonding, elemental valence and even dynamics. It is now possible to map ferroelectric displacements and octahedral tilts unit cell by unit cell, and therefore probe the fundamental origin of the numerous surprising but useful interfacial properties in oxide heterostructures. Example studies include the origin of electronic conductivity between two insulators, distinguishing various potential mechanisms such as interdiffusion, oxygen vacancies or interfacial valence mismatch [1], the importance of vacancy superlattices [2] and the role of substrate termination on ferroelectricity and spin transport [3-5]. Projects may be in collaboration with Prof. T. Venky Venkatesan of NUSNNI.


