ZERNIKE INSTITUTE COLLOQUIUM

Thursday, January 13th, 2011

16:00h, Lecture Hall: 5111.0080 **Coffee and cakes from 15:30h**

It's a Material World

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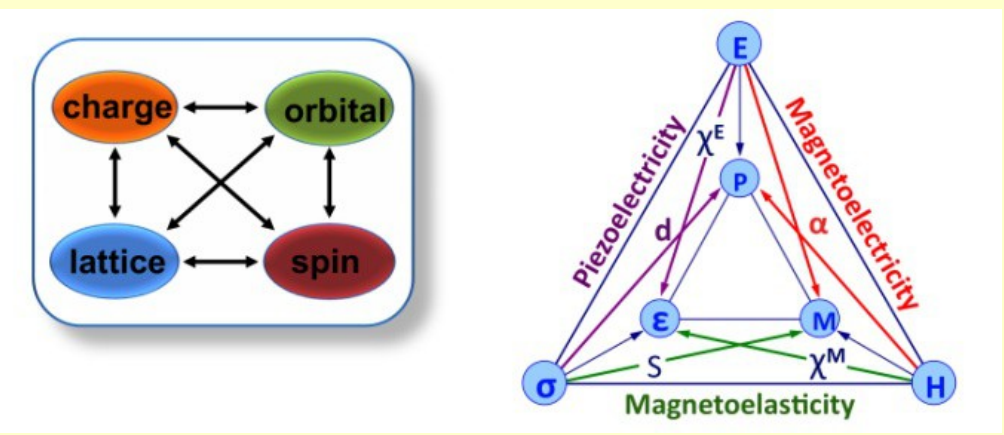
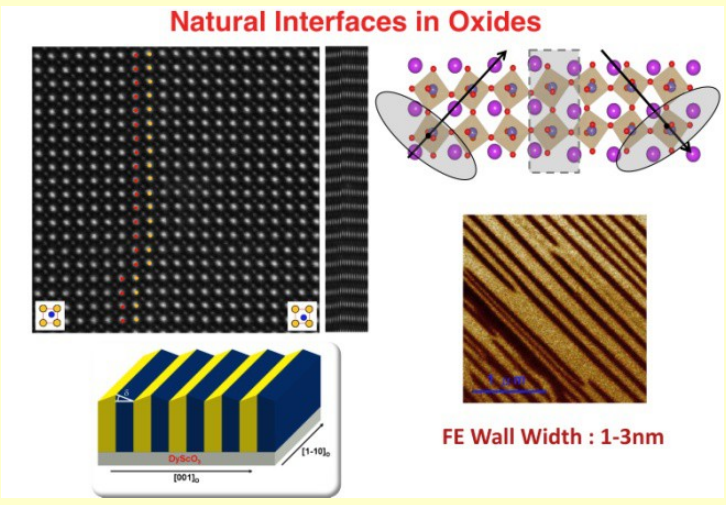
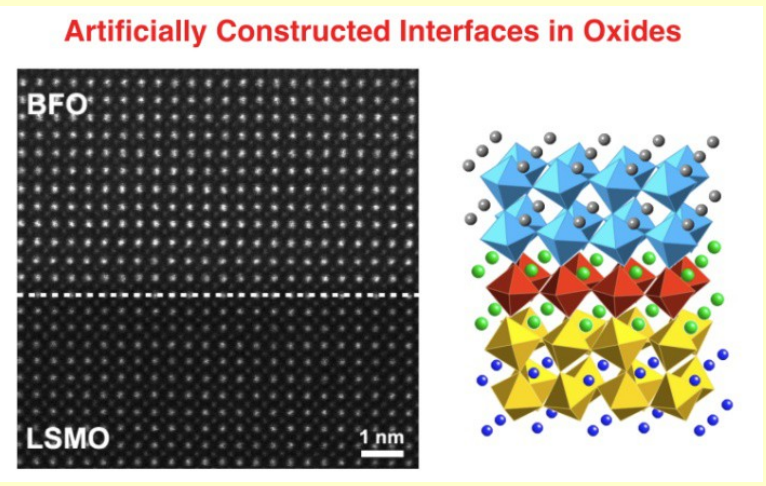
The world around us is filled with a plethora of materials, natural and man-made. Through the advances made in the design, synthesis and theoretical frameworks, it is now possible to design materials at almost the atomic scale.



In this talk, I will use Complex Oxides as an illustrative system to explore the interplay between atomic structure and functional responses. Such materials are particularly interesting since they bring to bear the charge, spin, orbital and lattice degrees of freedom to reveal a rich diversity of physical phenomena, such high temperature superconductivity, colossal magnetoresistance, multiferroicity.



Using epitaxy as the approach to create model heterostructures, we are exploring novel physical phenomena at Natural and Artificially Engineered interfaces. At natural interfaces, such as domain walls in multiferroics, we observe the emergence of novel magnetotransport behavior as a consequence of the enhanced magnetic moment and electronic transport at such walls.



At artificially engineered interfaces, for example between the ferromagnetic LSMO and antiferromagnetic BiFeO3, we observe the emergence of a novel ferromagnetic state in the BFO layer at the interface as a consequence of electronic and orbital interaction effects. This leads to an exchange coupling to the ferromagnetism in the LSMO layer that can be controlled with an electric field.

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