

# ***Introduction to oxide interfaces***

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Motivation: correlated materials as opposed to conventional semiconductors.

Electronic structure of transition metal oxides.

Control methods. Epitaxial strain, charge transfer.

Synthesis methods. MBE and PLD.

Characterisation methods. X-ray scattering, TEM with EELS.

Interfaces between a Mott insulator and a band insulator: the case of LaTiO<sub>3</sub>/SrTiO<sub>3</sub>.

Interfaces between polar and non-polar insulators: the case of LaAlO<sub>3</sub>/SrTiO<sub>3</sub>.

Doping mechanism, polar discontinuity, role of defects.

Magnetism and two-dimensional superconductivity.

Superconductor-insulator transition.

Interfaces between strongly correlated oxides: nickelates heterostructures.