Highlight: Probing a complex oxide interface directly

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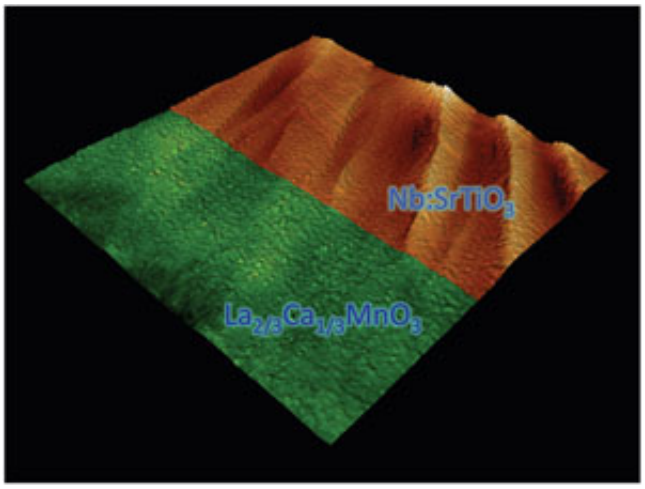

Electronic properties have been measured as function of the distance to the interface between La2/3Ca1/3MnO3 and Nb-doped SrTiO3.

(PhysOrg.com) -- A novel way to directly detect the electronic properties at a complex oxide interface has been demonstrated by users from Argonne's Advanced Photon Source working collaboratively with researchers in the Electronic & Magnetic Materials Devices Group (Argonne National Laboratory).

While powerful spatially resolved tools exist for visualizing the chemical and magnetic structure of an interface, direct observation of electronic behavior across the interface presents a major experimental challenge.

The scientists harnessed the high sensitivity to electronic local density of states (LDOS) of cross-sectional scanning tunneling microscopy and spectroscopy (XSTM/S) to visualize electronic properties at the interface between colossal magnetoresistant manganite $La_{2/3}Ca_{1/3}MnO_3$ and semiconducting Nb-doped $SrTiO_3$.

By extending XSTM/S to the interface, they mapped the LDOS across the boundary, unambiguously visualizing the interface by the location of the valence band, and elucidated the fundamental issue of band alignment at a complex oxide heterointerface.

More information: T.Y. Chien, J. Liu, J. Chakhalian, N. P. Guisinger, and J. W. Freeland, *Phys. Rev. B,* 82, 041101(R) (2010). Editor's Suggestion

Provided by Argonne National Laboratory

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