



复旦大学物理系物质科学报告

Hidden Phases Revealed at the Surface of Layered Transition Metal Compounds

Physics Department Colloquium

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Complexity in transition-metal compounds originates for the close and nonlinear coupling of spin, charge, orbital, and lattice degrees of freedom. Creating a surface disturbs the balance between these degrees of freedom, and in many cases results in phased Hidden in the bulk. Several examples will be presented to illustrate this phenomenon.

1) Dynamic antiphase spin domain walls have been proposed for the parent compound of the Fe based superconductor BaFe_2As_2 .

The surface $(\sqrt{2} \times \sqrt{2})R45^\circ$ phase displays a coupled structural-magnetic antiphase domain walls with a reduced symmetry compared to the bulk.

2) The (1×2) surface phase $\text{Ca}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}$ stabilizes Antiferromagnetic Ordering leading to the coexistence of superconductivity and antiferromagnetic ordering.

3) The final example is for Mn doped double-layer Ruthenate $\text{Sr}_3(\text{Ru}_{1-x}\text{Mn}_x)_2\text{O}_7$, where the surface phase diagram is almost opposite from the bulk due to surface induced tilt of the octahedral in the parent compound. The surface of $\text{Sr}_3(\text{Ru}_{0.84}\text{Mn}_{0.16})_2\text{O}_7$ is metallic while the bulk is insulating, because the surface tilt has been removed.

Professor Plummer is a world-renowned scholar in surfaces, with a B A in Math and Physics from Lewis and Clark College, Portland, Oregon, and a Ph. D in Physics from Cornell University. He is a member of the National Academy of Science, a fellow of American Academy of Arts and Sciences (AAA S) and a recipient of Davission and Germer Prize of American Physical Society. He has authored ~400 papers, and has mentored for over 110 young scholars as graduate students or postdoctoral fellows.

Time: 2:00pm, Tuesday, 2016.05.31

Location: Physics Building, Room 221B

(Cookies and coffee are served from 1:45 pm)