Institute for Materials Science

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CMMS Colloquium - Sponsored by the Institute for Materials

Prof. Gabriel Aeppli
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Paul Scherrer Institute, Switzerland

Are all interesting oxides inhomogeneous?

Wednesday, August 19, 2015
3:00 to 4:00pm
IMS/MPA Conference Room (TA-03, Building. 32, Room 134)

Abstract: Defects are responsible for the interesting and useful properties of conventional semiconductors, and we show here that defects and inhomogeneities play a similarly important role for transition metal oxides. We describe recent scan probe microscopy and X-ray experiments where we both characterize and control the responsible defects. In particular, we show the first direct images of oxygen adatom - vacancy pairs and their motion, including bistability and electric field induced switching - ultimately responsible for memristive action - alongside their effects on the electronic density of states. Furthermore, we have used X-ray microscopy first to establish the extraordinary inhomogeneity, due to ordered oxygen defect domains, of an “optimally” prepared high temperature superconductor, and then as a lithographic tool to “write” superconducting wires.

Bio: Gabriel Aeppli is professor of physics at ETH Zürich and EPF Lausanne, and head of the Synchrotron and Nanotechnology department of the Paul Scherrer Institute, also in Switzerland. After taking his B.Sc., M.Sc. and PhD in Electrical Engineering from MIT, he spent the majority of his career in industry (NEC, AT&T and IBM) where he worked on problems ranging from liquid crystals to magnetic data storage. He was subsequently co-founder and director of the London Centre for Nanotechnology, Quain Professor at University College London, and cofounder of the Bio-Nano Consulting Company. He is a frequent advisor to numerous private and public entities worldwide (including China, Australia, Europe and the US) engaged in the funding, evaluation and management of technology. He has been elected to the American Academy of Arts and Sciences, the US National Academy of Sciences and the Royal Society (London), and was a recipient of the Mott Prize of the Institute of Physics(London), the Oliver Buckley prize of the American Physical Society and the Neel Medal/International Magnetism Prize. His current technical focus is on the implications of photon science and nanotechnology for information processing and health care.

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Hosted by Filip Ronning