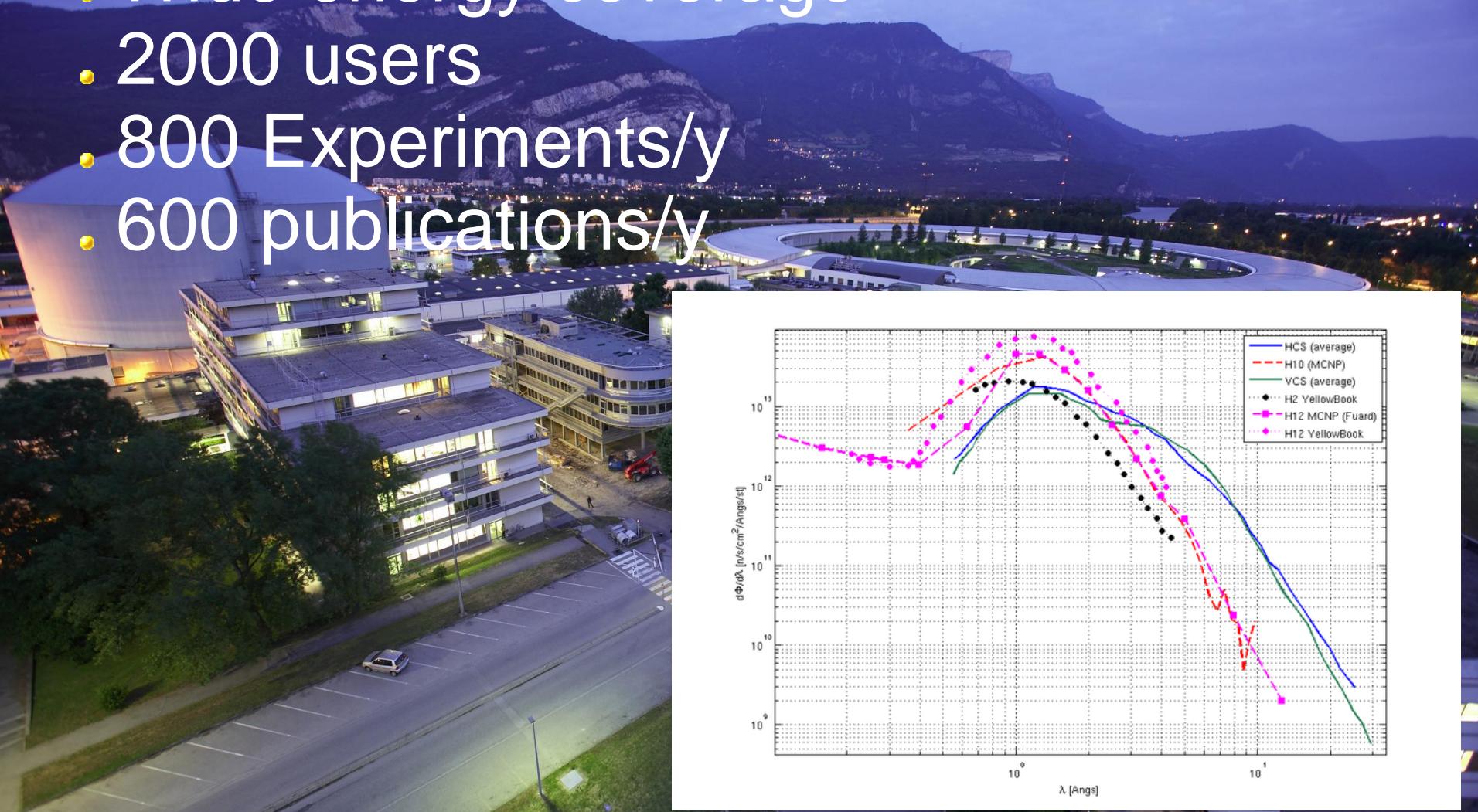




The Institut Laue-Langevin operates the world's most intense neutron source

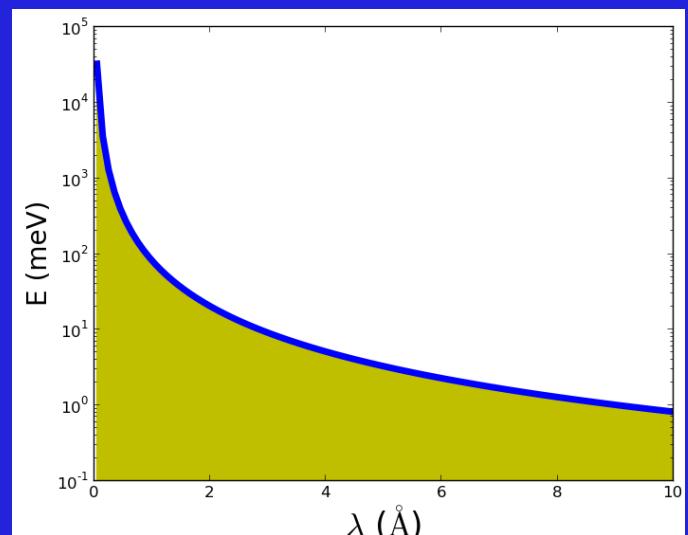
to reveal the fundamental
properties of materials

- 58 MW reactor, most intense source of neutrons for research
- Wide energy coverage
- 2000 users
- 800 Experiments/y
- 600 publications/y



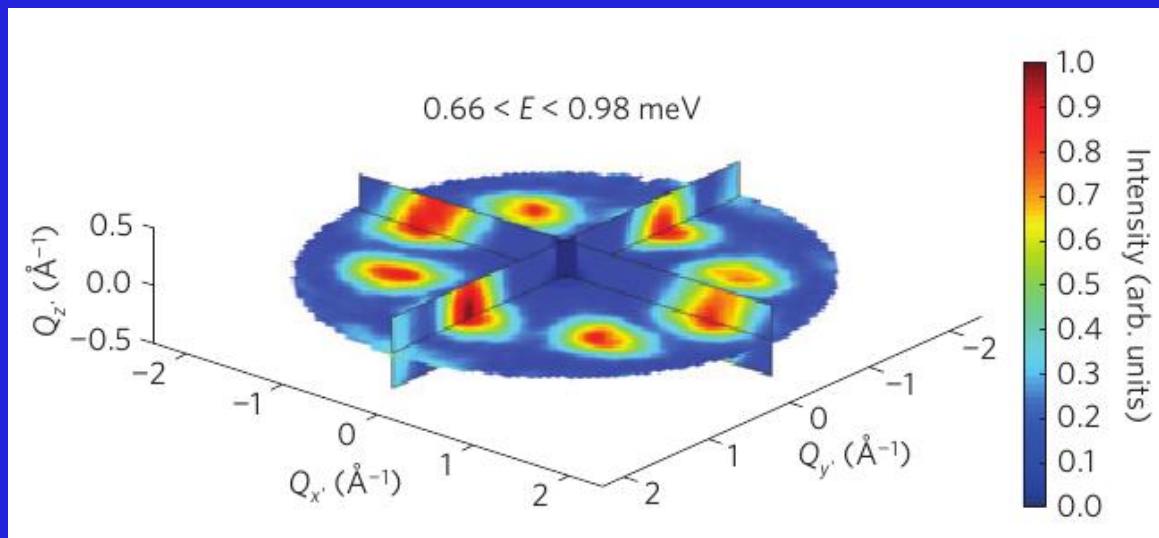
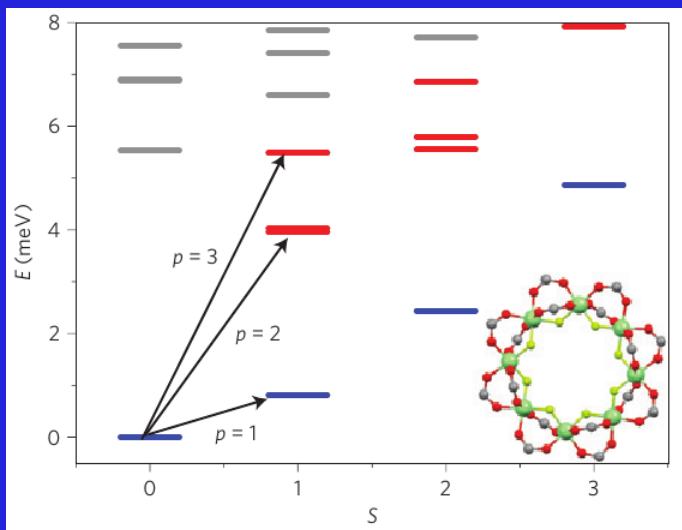
Neutron facts

- 1) Non-charged particle, large penetration depth
- 2) Kinetic energy comparable to fundamental excitations in solids
- 3) Nuclear spin $I=1/2$, magnetic interaction with unpaired e⁻
- 4) The interaction potential is small
scattering cross sections
computed accurately
- 5) Spin-polarized

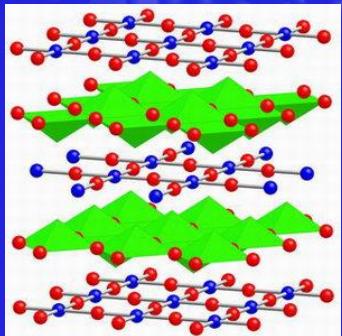




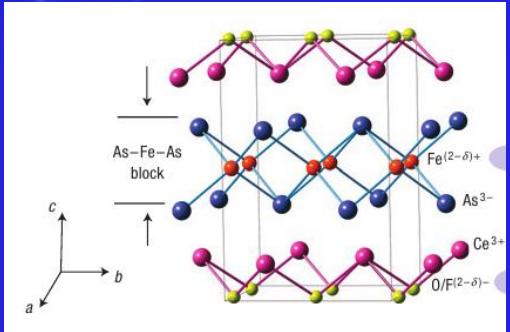
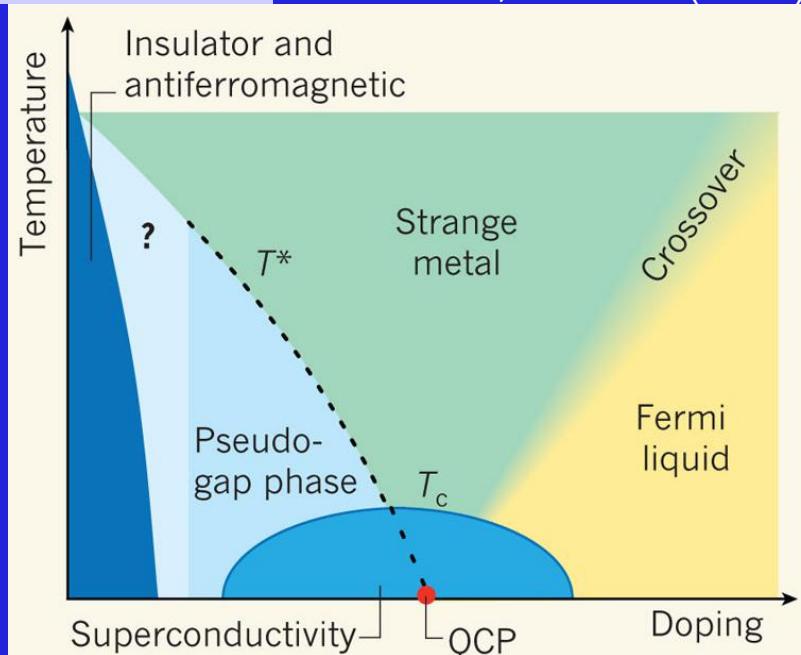
Probing large volume in energy-momentum space



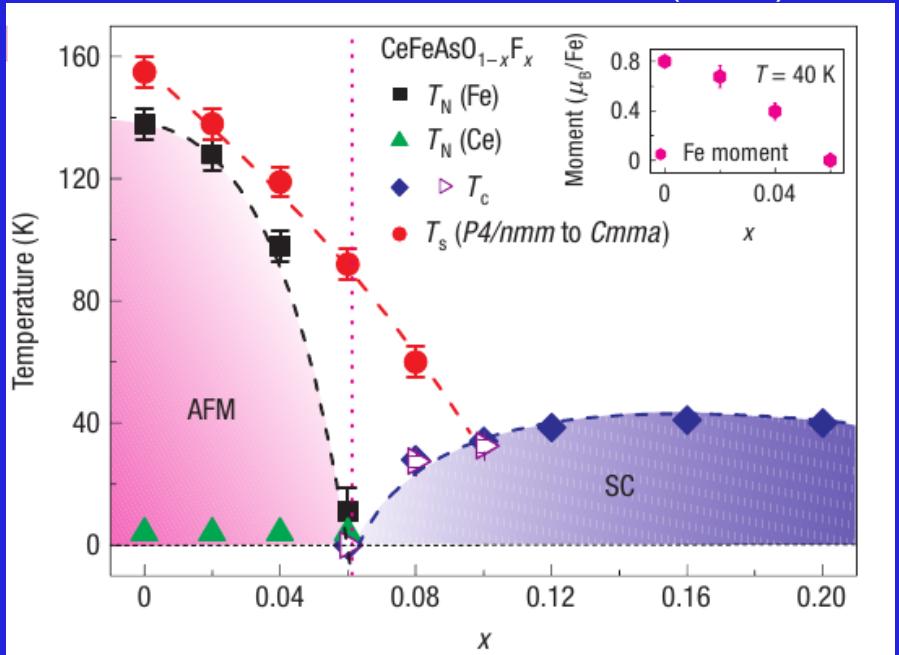
The challenge of superconductivity



Chandra Varma Nature 468, 184–185 (2010)

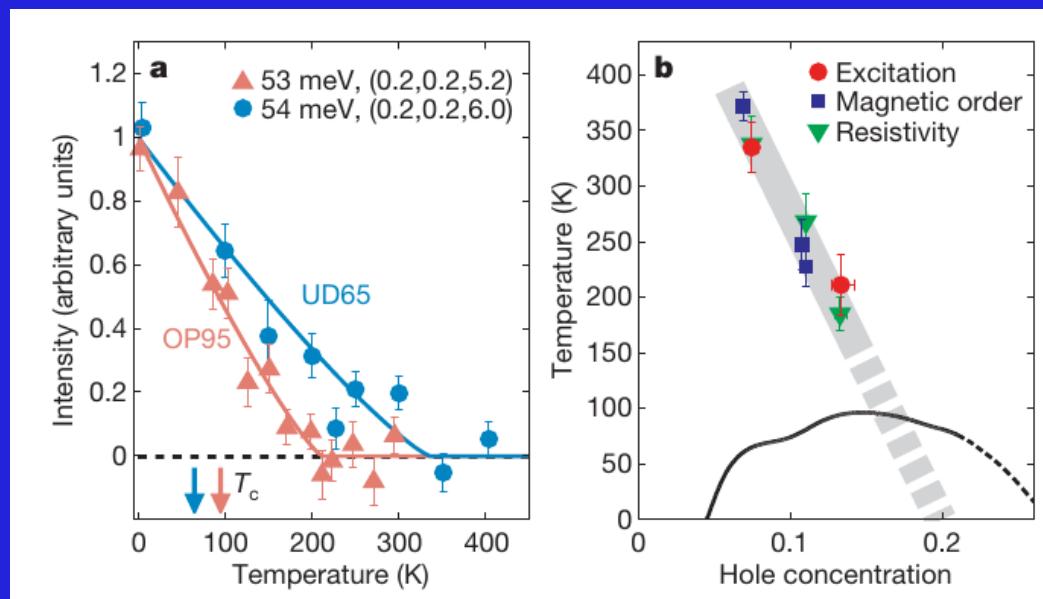
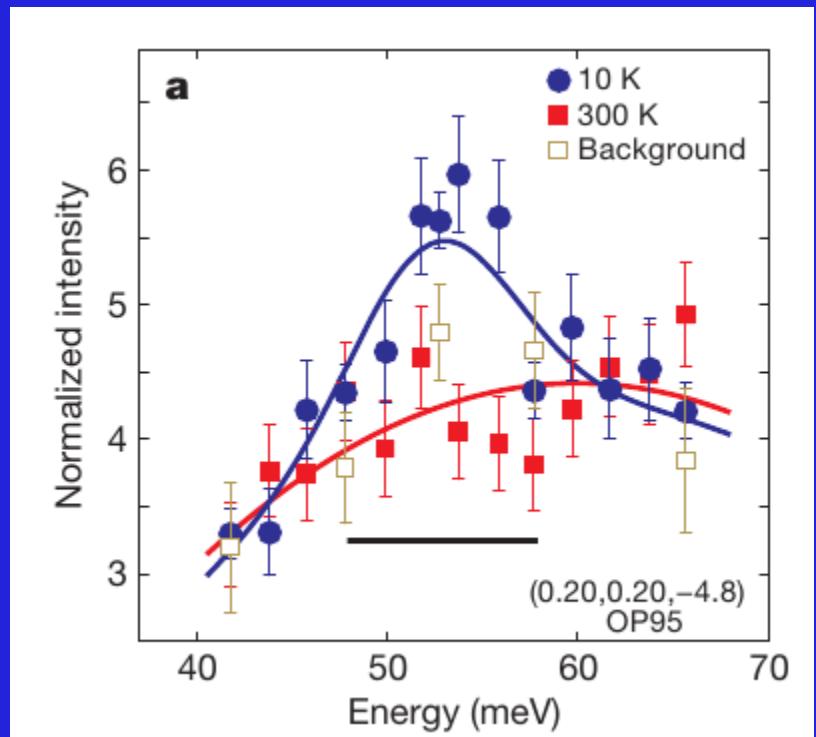


J. Zhao, Nat. Materials, 7, 953, (2008)



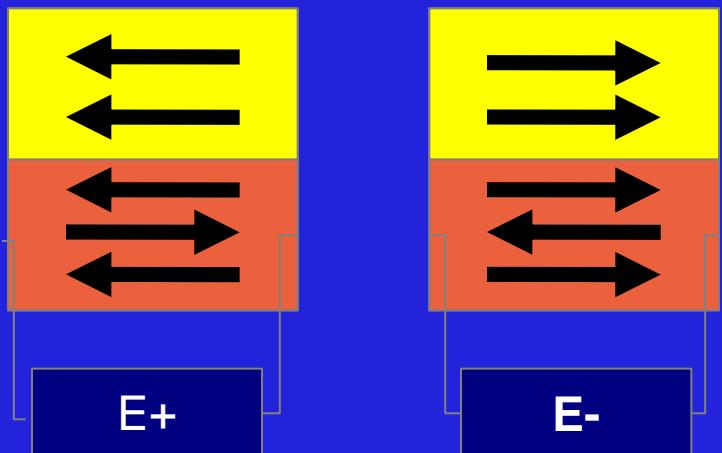
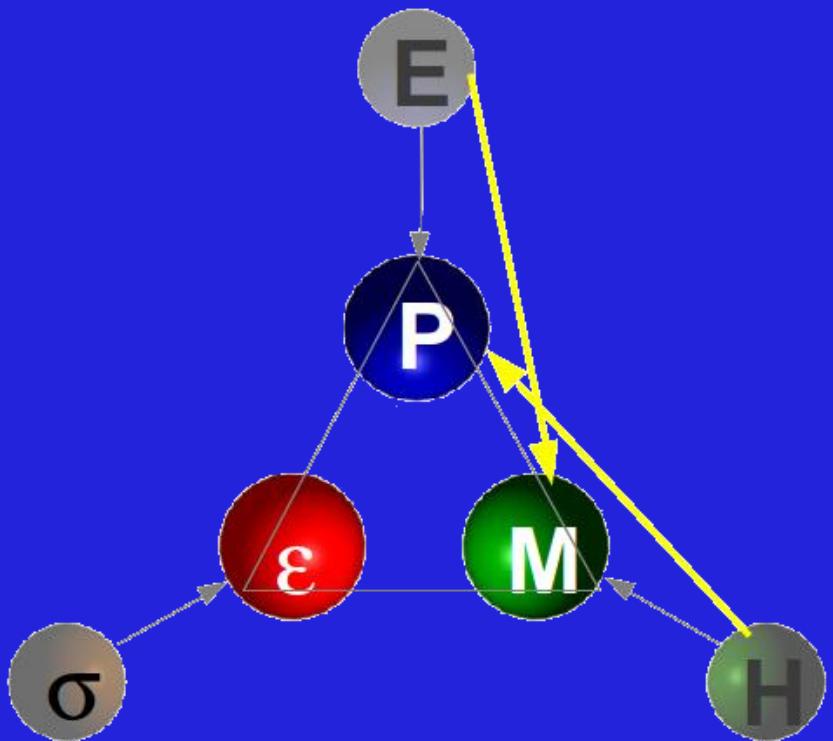
The infamous pseudogap phase

Evidence for circulating currents



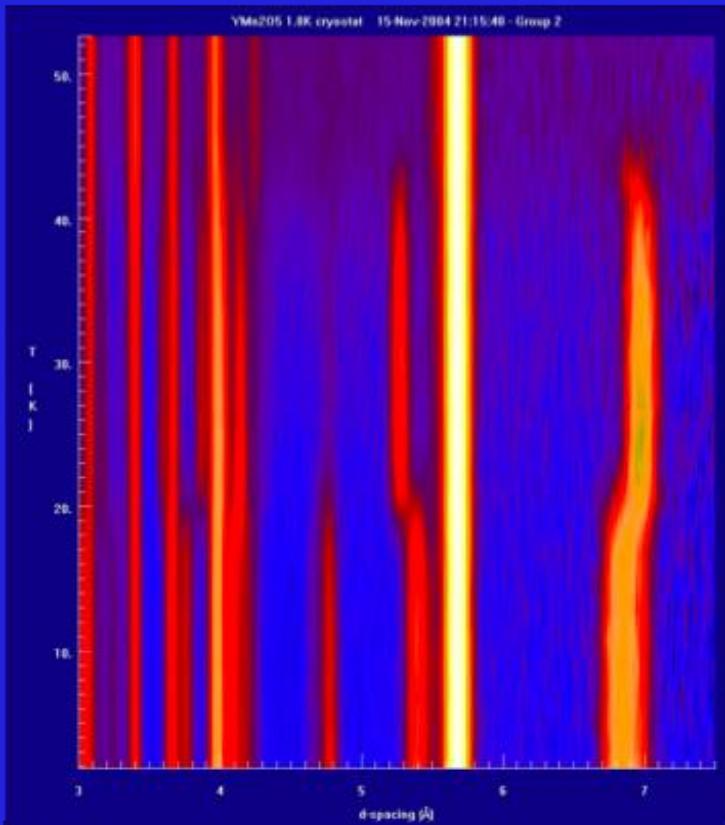
Y. Li et al. , Nature, 468, 283 (2010)

Multiferroics

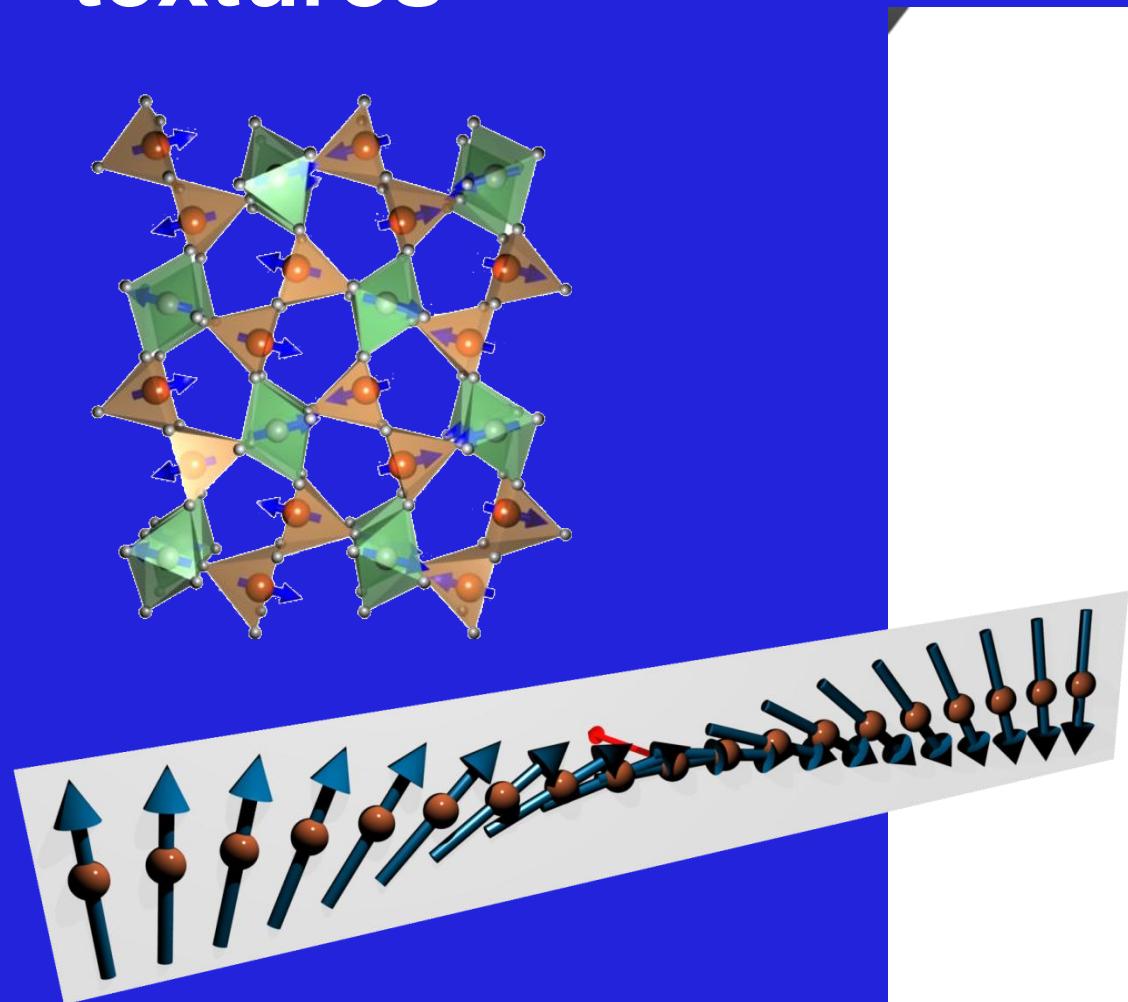


Electrical tuning
of magnetic state

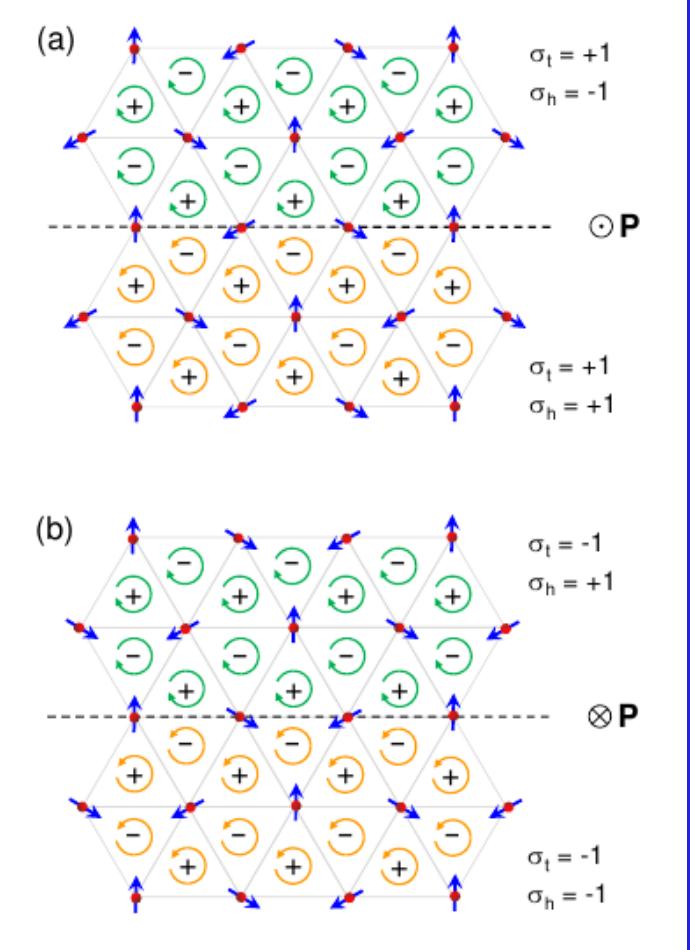
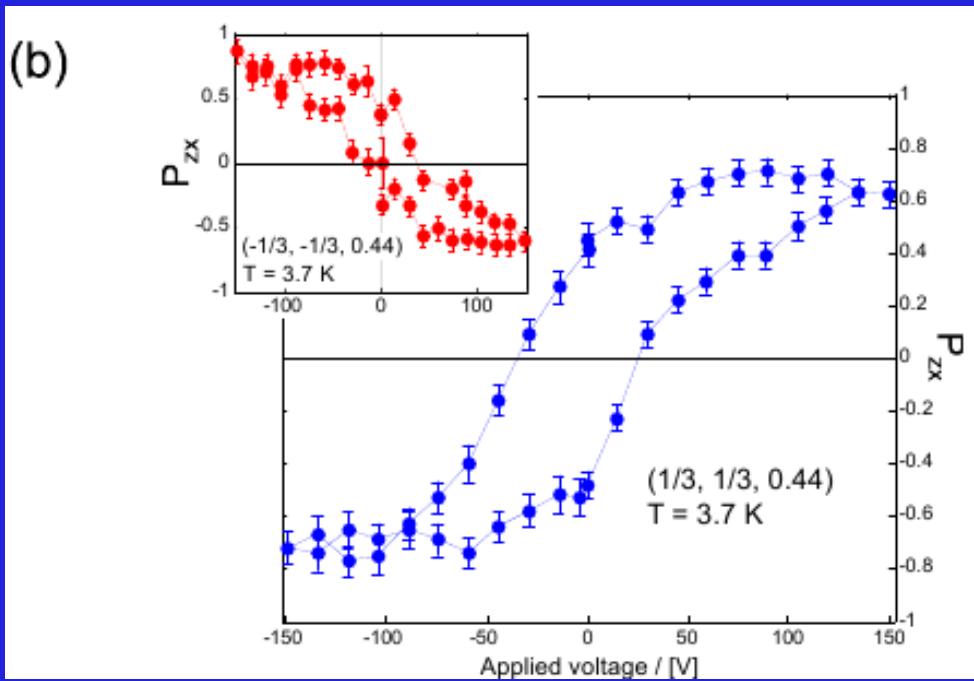
Multiferroics: complex spin/orbital textures



L. Chapon et al.



Understanding the magnetoelectric coupling mechanisms



A. Hearmon et al., *PRL* 108, 237201 (2012)