



Università di Roma "Tor Vergata"



Consiglio Nazionale delle Ricerche

INCONTRO

*Nell'ambito degli "Incontri sulla sensoristica" il giorno **venerdì 14 maggio 2010** alle ore **15.00** presso l'aula "G. Ruffino" del Dipartimento di Ingegneria Meccanica (edificio Ing. Industriale, II piano) il **Prof Lucio Braicovich** del Dipartimento di Fisica del Politecnico di Milano. terrà un seminario su:*

The study of magnetic excitations of cuprates with Resonant Inelastic X-Ray Scattering: results and perspectives

After introducing the Resonant Inelastic X-ray Scattering (RIXS) we concentrate on magnetic excitations in cuprates. We have recently found that RIXS at the L3-edge of Copper can be used to measure the dispersion of spin excitations in cuprates both undoped and doped. Up to now this was possible only with neutron scattering. Indeed the x-rays (used in the RIXS mode) extend dramatically the possibilities of experimental work since it becomes possible to study very tiny objects not accessible to neutrons as thin films and, in perspective, nano-objects having both fundamental and technological interest.

The cases of La_2CuO_4 and $\text{L}_{(2-x)}\text{Sr}_x\text{CO}$ will be used as a benchmark and in particular we will show that single magnons are seen with RIXS in La_2CuO_4 in perfect agreement with neutrons. Moreover the xrays have already shown new features in doped systems not seen with neutrons so that the cross fertilization between the two approaches is expected to be particularly promising. In particular in $\text{L}_{(2-x)}\text{Sr}_x\text{CO}$ we have seen spin excitations up to high energies (around 300 meV) surviving to doping in the under-doped regime (8% holes) a fact not known up to now. We show also that the sensitivity and selectivity of RIXS allow the study of the strain effects on very thin films of CaCuO_2 ; this new approach gives the simultaneous measurement of the "pressure" effect on super-exchange and on crystal field. Finally the perspectives of RIXS are briefly discussed.