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Charge and magnetic excitations in hole- and electron-doped infinite layer cuprate superconductors G. DELLEA, CNR-SPIN, CNISM and Dip. Fisica, Politecnico di Milano, IT, L. MARITATO, A. GALDI, P. ORGIANI, CNR-SPIN and Univ. degli Studi di Salerno, IT, D.G. SCHLOM, Material Science and Engineering Dept., Cornell University, US, D. DI CASTRO, A. TEBANO, G. BALESTRINO, CNR-SPIN and Univ. di Roma Tor Vergata, IT, C. ARUTA, CNR-SPIN and Univ. di Napoli Federico II, IT, M. MORETTI SALA, N.B. BROOKES, ESRF, Grenoble, FR, C.J. JIA, B. MORITZ, T.P. DEVEREAUX, SLAC and Stanford Univ., US, M. MINOLA, C. MAZZOLI, L. BRAICOVICH, G. GHIRINGHELLI, CNR-SPIN, CNISM and Dip. Fisica, Politecnico di Milano, IT — Infinite layers (IL) present the simplest crystallographic structure among layered cuprates. Here we present $Cu - L_3$ resonant inelastic x-ray scattering (RIXS) measurements on insulating and superconducting IL systems. In particular, we compare spectra for the two possible doping mechanisms, n- and p-type. $(CaCuO_2)_m/(SrTiO_3)_n$ superlattices are characterized by hole doping,[1] while $Sr_{1-x}La_xCuO_2$ presents electron doping.[2] Beside several analogies, the two systems show noticeable differences in evolution with doping level of the charge excitation continuum and of the magnetic peak intensity and damping. These trends can be found also in the corresponding theoretical calculations, in which the spin-spin correlation function is determined using a single band Hubbard model plus 2p core level with spin-orbit coupling.[3]

[1]D. Di Castro et al., Phys. Rev. B 86, 134524(2012).
[2]L. Maritato et al., J. Appl. Phys. 113, 053911(2013).
[3]C. J. Jia et al., http://arxiv.org/abs/1308.3717(2013).

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