Magnetic and transport properties of lightly doped $La_{2-x}Sr_xCuO_4$
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Campinas, Brazil — We address the problem of the static magnetic correlations in
La_2CuO_4 [1] and lightly doped $La_{2-x}Sr_xCuO_4$ within the framework of a dipolar
frustration model for a canted antiferromagnet [2]. We show that the Dzyaloshinskii-
Moriya and XY anisotropies are responsible for robustness of the Neel state for
$x < 2\%$ while, for higher doping, the antiferromagnetic ground state is unstable
towards a helicoidal magnetic phase. The helicoidal spin structure gives rise to
incommensurate peaks in elastic neutron scattering, and is consistent with recent
Raman and magnetic susceptibility experiments in $La_{2-x}Sr_xCuO_4$. We propose that
the dissipative dynamics of topological defects in a spiral state is responsible for the
transport properties in the spin-glass phase of cuprates [3]. The calculated damping
matrix is related to the in-plane resistivity, which exhibits an anisotropy and linear
temperature dependence in agreement with experimental data. References: [1] M.
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