CHARGE TRANSPORT IN CUPRATES BY MAGNETIC TOPOLOGICAL EXCITATIONS:TOPOLOGICAL EXCITATIONS IN FRUSTRATED BACKGROUND.

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The magnetic phase of Nd doped $La_{2-x}Sr_xCuO_4(0.02 < x < 0.05)$(LSCO) is a spiral spins phase, where a fraction of spirals form the collinear ordered, incommensurate superstructure making a spins system highly anisotropic without violation of homogeneous charge distribution. Essential for the charge transport in cuprates are the spin topological excitations(TE) with finite mass(they can move) since it is natural to assume that the charge carriers are attached to them.

We claim that the relevant finite mass spin TE in LSCO are separated Z_2 non-Abelian vortices which fields are screened in the frustrated background making their energy(mass) finite. In the framework of the non-Abelian Higgs model, where the frustrations are represented by a gauge field of SO(3) group but the matter field by the order parameter of spiral spins phase, we have found finite mass non-Abelian Z_2 vortex solution. We argue that the motion of those vortices is diffusive and we have evaluated the vortex damping coefficient which enabled us, using Drude model of conductivity, to evaluate the temperature dependence of the cuprates resistivity $\rho(\rho \sim T$, at high temperature, in agreement with experiments). The presented model indicates the possibility of mechanism(based on spins degree of freedom)of formation of a strong conductivity anisotropy in cuprates without breaking the homogeneity of charge distribution.

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