

Chirality domain wall generated by Z_2 vortex in 2D frustrated Heisenberg spin system

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The state of the noncollinear spin system has additional quantum number – chirality: spin on a plaquette rotate clock- or counter-clock-wise. The order parameter of frustrated spin system is a rotation matrix, as the rotational symmetry is completely broken there. Such order parameter allows for existence of the spin Z_2 vortices in a system ($\pi_1(SO(3)) = Z_2$). We show that in the presence of a dipole spin anisotropy the order parameter space is reduced from the $SO(3)$ group manifold to a sphere S_2 . It results in the creation of a line terminating on Z_2 vortex, where the chirality of underlying spins is rapidly changed – the chirality domain wall. The structure of chirality domains and chirality of domain walls in the spiral phase of underdoped La-based cuprate is discussed.