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Quenched disorder and structure of short-range spin correlations IGOR ZALIZNYAK, Brookhaven National Laboratory — In many important cases, magnetic order existing in a crystal does not possess long-range coherence, but has short-range nature. In particular, such is the situation in a variety of doped perovskite oxides, including cuprates, nickelates and cobaltates, which have recently been extensively studied in view of their fascinating electronic properties. In the absence of macroscopic spin coherence, the Fourrier-transform of spin-spin correlation in the crystal, which determines elastic magnetic scattering measured in experiment, does not contain delta- functions giving rise to magnetic Bragg peaks. Instead, it contains broad diffuse peaks which experimenters usually describe by phenomenological profiles, such as Lorentzian, Lorentzian-squared, etc., some of which are only appropriate in the near vicinity of the peak position (e.g. in the Orstein-Zernike approximation). Here we consider a simple model of quenched disorder introduced by a system of static magnetic disclinations/stacking faults of various symmetry and dimensionality. The corresponding spin correlation function has a form of the "lattice-Lorentzian," where the Lorentzian's power is determined by the dimensionality of the disorder.

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