

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Anomalous diffusion on a hypersphere and time structure of two-point spin correlations in short-range-ordered doped oxides.¹ IGOR ZALIZNYAK, Brookhaven National Laboratory, GEORG EHLERS, Oak Ridge National Laboratory, GENDA GU, Brookhaven National Laboratory — Recently, much attention was paid to exploring charge and spin-ordered phases in strongly correlated transition metal oxides, such as superconducting cuprates and related nickelates, manganites and cobaltites. Using elastic neutron scattering, we have investigated the nano-scale structure of short-range charge and spin ordering in a half-doped cobaltite $\text{La}_{1.5}\text{Sr}_{0.5}\text{CoO}_4$, and found that they can be understood in the framework of an effective anisotropic 3D random field Ising model. Here we report on the measurement of the time-dependence of the spin-spin correlation function in this material by means of Neutron Spin Echo (NSE) spectroscopy. Our high-precision NSE data exclude simple Arrhenius and stretched-exponential relaxations and can be best described by the model of anomalous diffusion on the appropriate hypersphere. We argue that such time dependence is generic for short-range-ordered spin systems.

¹Supported under DoE Contract DE-AC02-98CH10886 and NSF grant DMR-0454672.

Igor Zaliznyak
Brookhaven National Laboratory

Date submitted: 27 Nov 2007

Electronic form version 1.4