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Interplay of disorder and geometrical frustration in Gadolinium Gallium Garnet NAYOON WOO, D.M. SILEVITCH, T.F. ROSENBAUM, Univ of Chicago — We study the effects of disorder on the geometrically frustrated Heisenberg antiferromagnet Gadolinium Gallium Garnet (GGG) using neodymium doping (0.1 to 1%) in combination with linear and nonlinear ac magnetic susceptibility. The Nd doping actually alleviates the effects of disorder due to excess Gd ions occupying Ga sites. The linear, frequency-dependent susceptibility reveals that 1% Nd doping suppresses the appearance of any long-range order from approximately 80mK to below 30mK. The dynamics of isolated, correlated spin clusters were studied as a function of doping level using nonlinear susceptometry. In this regime, both the aggregate moment of the clustered spins and the activation field required to excite a nonlinear response were inversely correlated with the dopant density.

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