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Experimental Determination of Spin Glass Lower Critical Dimension SAMARESH GUCHHAIT, RAYMOND ORBACH, The University of Texas at Austin — Zero field cooled (ZFC) measurements on thin film Ge:Mn spin glass can explore the lower critical dimension d_l. The correlation length $\xi(t,T)$ is nucleated upon a rapid quench into the spin glass phase, and grows to the thickness of the film, L, resulting in a transition for dynamics from $d = 3$ to $d = 2$ at a crossover time t_{co}. Our experiments demonstrate that conventional ZFC dynamics vanish at $t = t_{co}$, but there remain spins within a length scale $\leq L$ for which $d = 3$ dynamics remain. Because of the ultrametric distribution of states, the rise of the remaining ZFC magnetization exhibits an exponential time dependence determined by the highest barrier surmounted at t_{co}, $\Delta_{\max}(t_{co},T)$. By carefully choosing a temperature region where the dynamics fall within experimental time scales, both regimes are observed. Further, there is a direct relationship between the magnitude of $\xi(t_{co},T)$ and $\Delta_{\max}(t_{co},T)$. This relationship is satisfied, determining the parameters controlling the growth of $\xi(t,T)$ without arbitrary parameters. The existence of the crossover establishes that $2 < d_l < 3$ for spin glass dynamics, in agreement with theory for Ising (Franz *et al.*) and Heisenberg (Lee and Young) spin glasses.

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