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Absence of Self-Averaging in Disordered Heisenberg Models DONALD PRIOUR, JR., University of Missouri, Kansas City, SANKAR DAS SARMA, University of Maryland, College Park — With the aid of direct large-scale Monte Carlo simulations, we find a lack of self-averaging near the Curie temperature T_c for classical ferromagnetic Heisenberg models on disordered three dimensional lattices. Our calculations encompass a wide range of system sizes, generally systems with between 10^3 and 10^5 magnetic moments, and we have in general found the extent of the violation of self-averaging to be very stable throughout this range of sizes. In contradiction to the Harris Criterion, which predicts self-averaging to be intact for disordered Heisenberg models, we find the degree of violation of self-averaging (as extrapolated to the bulk limit) to rise monotonically with increasing disorder strength; even small amounts of disorder yield a nonzero, albeit weak, violation of self- averaging. We examine various bond and site disordered Heisenberg models, and we also consider strongly disordered RKKY models for dilute magnetic semiconductors, where we find a marked violation of self-averaging. This work has been supported by the US-ONR and NSF.

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