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Relevance of short-range correlations on the ferromagnetic order of dilute magnetic semiconductors B. MORITZ, Univ. Cincinnati, Univ. North Dakota, K. MIKELSONS, Univ. Cincinnati, Oak Ridge Nat. Lab., J. MORENO, Univ. North Dakota, M. JARRELL, Univ. Cincinnati, R. S. FISHMAN, Oak Ridge Nat. Lab. — We use the Dynamical Cluster Approximation (DCA) to study the ferromagnetic transition in GaAs doped with Mn. In addition to the local dynamics our approach includes the effects of short-range correlations. We study the critical temperature, the appearance of the impurity band and the development of the magnetization for a range of coupling strengths, doping, and carrier concentrations. We conclude that the understanding of short- range correlations in the ferromagnetic semiconductors is crucial for the successful design of spintronic nanostructures.

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