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Coulomb attraction and defects in dilute magnetic semiconductors P. L. REIS, M.A. MAJIDI, J. MORENO, University of North Dakota, R.S. FISHMAN, Oak Ridge National Lab, M. JARRELL, University of Cincinnati — Employing the dynamical mean-field approximation we study the phase diagram of a double-exchange model that includes interactions between the holes and the local magnetic moments and also the negatively charged ions. We calculate the ferromagnetic transition temperature, magnetization and susceptibility for a range of parameters and compare the results of a single band model with a four-band model which properly includes the heavy and light bands. The inclusion of the Coulomb attraction allows a better comparison with experiments by reducing the values of the exchange coupling needed to support a ferromagnetic transition. For small or intermediate exchange couplings the Coulomb attraction increases the transition temperature. We will also study a model where additional non-magnetic defects are included in the Hamiltonian. In the presence of these defects the ferromagnetic transition is expected to be rapidly suppressed.

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