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Spin Glass Solution to the Double-Exchange Model in Infinite Dimensions RANDY FISHMAN, Oak Ridge National Lab, JUANA MORENO, University of North Dakota, THOMAS MAIER, GONZALO ALVAREZ, Oak Ridge National Lab, FLORENTIN POPESCU, Florida State University — Using dynamical mean-field theory, we have evaluated the magnetic instabilities and T=0 phase diagram of the double-exchange model on a Bethe lattice in infinite dimensions. In addition to ferromagnetic (FM) and antiferromagnetic (AF) phases, we also study a broad class of spin-glass (SG) solutions with extensive entropy and short-range magnetic order. In the weak-coupling limit, a SG has a higher transition temperature than the AF phase for all fillings p below 1 and can even have a higher transition temperature than the FM phase. At T=0 and for small Hund's coupling, a SG has lower energy than either the FM or AF phases for $0.26 < p < 1$. Phase separation is absent as the Hund's coupling vanishes but appears for any non-zero value. Our T=0 phase diagram agrees remarkably well with Monte-Carlo results in two and three dimensions. The stability of a SG at T=0 can be understood by examining the interacting density-of-states, which is gapped for any nonzero Hund's coupling in an AF but only when the Hund's coupling exceeds a critical value in a SG.

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