Abstract Submitted
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Dynamical Mean Field Study of Ferromagnetism in Mn Doped GaAs KARAN ARYANPOUR, Department of Physics, University of California, Davis, JUANA MORENO TEAM[1], MARK JARRELL TEAM[2], RANDY FISHMAN TEAM[3] — Ferromagnetic semiconductors such as $Ga_{1-x}Mn_xAs$ have been of great interest lately as spins in these compounds can be used to carry information (spintronics). It has been shown that the strong spin-orbit interaction in these materials together with spatial disorder leads to highly frustrated magnetic correlations. This intrinsic frustration pushes these systems into strongly spin disorder ferromagnetic regimes making them behave similarly to spin glass compounds. We solve the spin-orbit interaction analytically using the DMFA. Our results exhibit the substantial decrease of the magnetic order parameter due to the frustration originating form the strong spin-orbit coupling. There is also evidence for the formation of an impurity band inside the pure $GaAs$ gap for large values of the carrier-impurity interaction coupling. The formation of this impurity band gives rise to an increase in T_c and the discontinuity of the chemical potential. The frustration is also responsible for the suppression of the carrier spin polarization which is a key quantity for the spintronics applications.

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