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Strong Electron correlation in the Cobaltates: a CDMFT study
DIMITRIOS GALANAKIS, TUDOR STANESCU, PHILIP PHILLIPS, Univ. of Illinois, Urbana-Champaign — The cobaltates Na_xCoO_2 with $0 < x < 1$ are highly anisotropic materials that consist of two dimensional CoO_2 layers separated by insulating layers of Na^+ ions. The structure is a triangular net of edge-sharing oxygen octahedra with the Co ions occupying the center and having a valence determined by the sodium concentration. The experimental evidence suggests a strongly correlated physics similar to that of the cuprates. The main difference comes from the geometrical frustration of the triangular lattice. Their phase diagram consists of a paramagnetic metal for $x < 0.5$, a Curie-Weiss metal for $x > 0.5$ and a singular insulating state at $x = 0.5$. The properties of these phases are studied within the planar one-band Hubbard model in the framework of Cluster Dynamical Mean Field Theory (CDMFT) on a triangular lattice. The spectral function, magnetic susceptibility are obtained as a function of filling and temperature.

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