Theoretical modelling of superconducting nickelates

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Recent discovery of superconductivity in **Sr** doped infinite layered nickelate $\mathbf{Nd}_{1-x}\mathbf{Sr}_x\mathbf{NiO}_2$ opens up the need to revisit the electronic structure and physical properties of nickelates. In experimental synthesis of layered nickelates from **Ni**-based rare earth perovskite, critical aspects such as stoichiometric instability accompanied with electronic and magnetic phase change, play an important role. Moreover, plethora of many conventional and unconventional phenomena are found in these Quasi-2D (Crossover between 2D and 3D) systems which can be understood on reconsidering similarities and difference between nickelates and cuprates. In both cases superconductivity is achieved by doping a parent compound. Doping is realized by atomic substitution of rare-earth (**Nd** substitution), resulting emergence of new effects from disorder and electronic correlations from the rare-earth.

Based on this aspect, a complementary theoretical approach , preliminarily using a Tight Binding (**TB**) model, is attempted with aim to modify and generalize the Dynamical Mean Field Theory (**DMFT**).The model parameters are first chosen phenomenologically to ensure the bench marking of the previous available results.