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Textured electronic states of the triangular lattice Hubbard model and Na_xCoO_2 near $x = 1/3$ KUN JIANG, Boston College, SEN ZHOU, ITP,CAS, ZIQIANG WANG, Boston College — The interplay between geometric frustration and strong correlation is studied in the triangular lattice Hubbard model near electron doping $x = 1/3$, in connection to the sodium cobaltates Na_xCoO_2. We found a mechanism of alleviated magnetic frustration via charge and spin inhomogeneity. At $x = 1/3$, the uniform paramagnetic ground state for $U < U_{c1}$ transforms into a $\sqrt{3} \times \sqrt{3}$ spin-charge textured insulating state for $U > U_{c2}$ with antiferromagnetic order on the underlying unfrustrated honeycomb lattice. The transition region, $U_{c1} < U < U_{c2}$, shows several textured semi-metallic states with both collinear and noncollinear magnetic order. We obtain the phase diagram and show that the strongly correlated phases near $x = 1/3$ corresponds to doping the "1/3 state" with excess carriers forming electron or hole Fermi surface pockets, and compare to experimental findings. We thus propose that the cobaltates near $x = 1/3$ are in proximity to such "hidden" textured phases with spin and charge order and the enhanced electronic fluctuations can mediate the superconducting pairing interaction.

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