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**Systematic band-filling dependence in the strongly-correlated triangular lattice**[1] H. LI, S. MAZUMDAR, U. Arizona, R. T. CLAY, Mississippi State U. — Strongly correlated triangular lattices are of interest because of their applicability to real systems such as superconducting organic charge-transfer solids (CTS) and the hydrated sodium cobaltate. Experimental work on nonhydrated $Na_xCoO_2$ have found (a) a charge-ordered semiconductor at $x = 0.5$, (b) Curie-Weiss metal for $x > 0.5$, and (c) paramgnetic metal for $x < 0.5$. The strong $x$-dependence is reminescent of the band-filling dependence in CTS conductors [2] We have performed numerical calculations based on the extended Hubbard Hamiltonian to understand the $x$-dependence. We show that for *finite* Hubbard $U$, and moderate nearest neighbor interaction $V$, the normalized probability of double occupancy, which is a measure of the strength of the electron correlation, varies strongly as a function of the density of carriers. We are able to explain (i) the different behavior of $x < 0.5$ and $x > 0.5$, (ii) the absence of the $\sqrt{3} \times \sqrt{3}$ charge-ordering at $x = 1/3$, and (iii) why $x = 0.5$ is unique. Cobalt valence of 3.5 in the superconducting hydrated cobaltate is in agreement with our proposed mechanism of superconductivity in the CTS. [3]

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