Phases and Phase Transitions in the Two-Dimensional Ionic Hubbard Model\textsuperscript{1}  TYLER BRYANT, UC Davis, RAJIV R. P. SINGH, UC Davis — We study the two-dimensional Ionic Hubbard model at half filling on a square lattice using linked cluster expansions \cite{1}. The model consists of a Hubbard model with alternating site energies. In one dimension, it is known that there is an intermediate spontaneously dimerized phase separating the band insulator phase from the Mott insulator phase \cite{2,3}. We calculate the ground state energy, local moment, spin-spin correlations, and dimer-dimer correlations to 12th order, starting from the band insulator phase. Using series extrapolation techniques the phase diagram of the model and the nature of the phase transitions is studied.

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