Phases and Phase Transitions in the Two-Dimensional Ionic Hubbard Model[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 [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 [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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