

Abstract Submitted
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Counter-Nagaoka-Thouless Problem On the Triangular Lattice

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On the frustrated triangular lattice, the Nagaoka -Thouless theorem predicts ferromagnetism in the case of a single hole in the $U = \infty$ Hubbard model for a particular sign of hopping ($t > 0$), while for the counter case ($t < 0$), nothing is known exactly or rigorously. We study the counter case for the triangular lattice motivated by the connection with the physics of sodium cobaltate Na_xCoO_2 , which realizes this physical situation. We investigate the competition between charge ordered states, Néel ordered states and spin liquid states, by studying small clusters variationally as well as using exact diagonalization. While the ground state always seems to be a singlet for clusters with an even number of electrons, the full spectrum gives insights into the possibility of long ranged order. Comparing the spin configurations for specific locations of the hole with those of an *odd site* Heisenberg model followed by spin projection, enable us to examine as well as evaluate the notion of the charge carriers being solitons or holons in a well prepared spin background.

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