

Novel liquid state of spinless fermions on a triangular lattice

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We propose a new type of charge liquid state in the spinless fermion system on a triangular lattice interacting via inter-site Coulomb interactions, V . In the strong coupling limit ($t=0$), the ground state is classical and disordered due to geometrical frustration[1]. The introduction of small t will drive the system to a partially ordered phase which we call a "pinball liquid"[2]. A possibly long range ordered Wigner crystal solid coexist with a liquid component which are moving around them like a pinball. This liquid is dominant over wide range of filling, even away from the regular triangle, and is also realized in the hard core boson systems. The phase diagram of the present system including the anisotropy of t and V is also presented in relevance to the organic crystal , θ -ET₂X.

[1] G. H. Wannier, Phys. Rev. **79** (1950) 357.

[2] C. Hotta and N. Furukawa, condmat/0605045/.

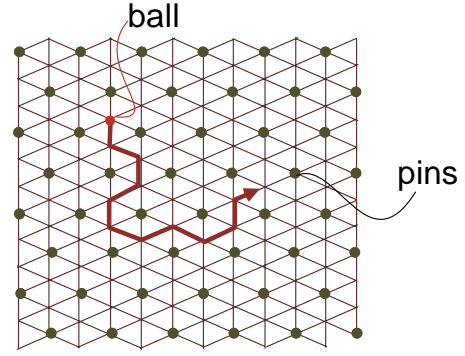


FIG.1: Schematic illustration of a pinball liquid state near 1/3-filling.