Competition between charge and spin order in the t-U-V extended Hubbard Model on the triangular lattice

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In this lecture we study the ground state properties of extended Hubbarad model on square and triangular lattices. We use the equation of motion for time dependent Green function and derive expressions for charge and spin response functions. Our response functions are expressed in term of free response function and some constants, so called local field factors. Local field factors are then fixed by a set of sum-rules and constraints. We shows that these local field factors solely depend on pair correlation functions. Pair correlation functions also related to structure factors and structure factors can be calculated using response function. These physical quantities are related by a set of self-consistent equations which can be solved numerically. We can also study the ground state of system by looking at singularities of charge and spin response function. The ground state of a extended Hubbard model on triangular lattice is very rich and shows different type charge and spin orders such as charge and spin density wave, incommensurate charge and spin density wave, paramagnetism, phase separation and ferromagnetism.