

Abstract Submitted
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An Alternative model of Spin-Dependent Double Well Lattice for Ultra-Cold Atoms XIAOHE ZHOU, Univ of Texas, Dallas — The theory of Bose-Einstein Condensation has been a widely studied issue since first proposed in 1924. However, most of its predictions are lacking in experimental verification. Not until 2009, a group from NIST conducted an experiment which created a synthetic magnetic field in solids where neutral atoms behaves like charged atoms. Their experiment provides a brand new perspective of studying condensed matter systems. This talk will consist two parts. First is a brief review of background knowledge: Starting from the NIST's experiment, fundamentals covering Raman laser, Bose-Hubbard Model as well as SSH chain are introduced; Then the second half, the talk will mainly based on my undergraduate project. Instead of the widely studied double well lattice model, I did a mathematical transformation to the lattice Hamiltonian in order to get an effective single well lattice model under external field. There are correspondences and certain simplicities merge comparing to the original lattice model. Phase transition under half-filling situation would serve as example for simplicity. In addition, common terminologies used in my work like mean-field theory and quantum phase transformation are introduced.

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