



清华大学高 研究院

Institute for Advanced Study, Tsinghua University

Title: Luttinger liquid effects in strongly correlated carbon nanotubes

Speaker: Dr. Wei Chen
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Time: 4:00pm, Monday, 2014-01-06

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

Correlation has been one of the central interests in the past few decades in condensed matter physics. In low dimensions, correlation effects are especially prominent. In two or higher dimensions, interacting electron systems can be reduced to non-interacting systems described by quasi-particles according to the Fermi liquid theory. However, in one dimension, the Fermi liquid theory breaks down and one needs the Luttinger liquid theory to describe an interacting system. As the existing 1D system of highest quality in nature, carbon nanotube (CNT) provides a perfect media to study Luttinger liquid physics. The chiral nature of electrons in CNT adds more richness to the physics. In this talk, I will discuss the Pierels and Mott transitions in nominally metallic carbon nanotubes under the frame of Luttinger liquid theory and show strongly modified effects due to correlation. If time allows, I will also discuss a novel quantum critical behavior in a Mott CNT pn junction due to electron correlation. Relevant experimental works will be discussed as well.