Abstract for the Eurasia-Pacific Summer School and Conference 2012 (Invited talk)

Manipulating the quantum phase of quasi-particles: 2D Aharonov-Bohm effect

Afif Sıddıki

Department of Physics, Istanbul University, Turkey

(E-mail: afifsiddiki@gmail.com)

Here, I will report on the recent experimental and theoretical findings concerning the unusual Aharonov-Bohm interference observed in constrained 2D electron systems. The origin of conductance oscillations resulting from the quantum phase or Coulomb blockade will be discussed in detail. I will argue that, opposing the mainstream explanation, the non-chiral incompressible edge states are responsible of the observed phenomena. The self-consistent calculation scheme to obtain electronic states will be presented. In addition, by solving the time dependent Schroedinger equation, I will show the dynamics of the interfering electron.