

Mansour Shayegan – Colloquium 10/11/2018

Title: "Probing Exotic States of Interacting 2D Electron Systems"

Abstract: There has been a surge of recent interest in the physics of interacting 2D electrons in a large perpendicular magnetic field when they occupy a half-filled Landau level. The long ago proposed composite fermion (CF) picture, in which two magnetic flux quanta are bound to each electron to form a CF, explains many properties of the system. These include the compressible (metallic) behavior of the 2D system at filling factor $\nu = \frac{1}{2}$, the existence of a Fermi contour with a well-defined Fermi wave vector, and the presence of fractional quantum Hall states as the filling deviates from $\nu = \frac{1}{2}$. In this talk, I will highlight the results of several recent experiments, performed on very high mobility 2D electron and hole systems confined to GaAs/AlGaAs quantum wells, that probe CFs via measuring the geometric resonance of their cyclotron orbit diameter with the period of an imposed, unidirectional density modulation.