



Weekly Seminar

**many-body physics in 2D electron systems
with record-high mobilities**

Mansour Shayegan

Princeton University



Time: 3:00pm, April. 27, 2022 (Wednesday)

时间: 2022年4月27日 (周三) 下午3:00

Zoom Meeting: <https://princeton.zoom.us/j/92306173761>

Zoom Meeting ID: 923 0617 3761

Abstract

The systems we are studying, namely novel, high-quality, quasi-two-dimensional electron and hole systems in selectively doped GaAs/AlGaAs heterojunction structures, are among the cleanest carrier systems available. In these structures, the mobile carriers are spatially separated from the dopant (impurity) atoms to minimize scattering. As a result, the mean-free-path of carriers at low temperatures reaches several microns, allowing the studying of ballistic and phase-coherent transport. Such structures also provide a crucial and important test bed for new many-body physics, since the dominant interaction at low temperatures is the repulsion between the electrons themselves.

In this talk, I will present fabrication and physics of GaAs/AlAs structures containing 2D electrons with record-high mobilities, exceeding 50 million cm^2/Vs . The residual (unwanted) impurities in these samples are less than about one per 10 billion Ga/As/Al atoms. The talk will focus on many-body physics in these samples, with a focus on spontaneous valley and spin ferromagnetism, and an anisotropic Wigner crystal at low electron densities.

About the speaker

Mansour Shayegan, Professor of Electrical and Computer Engineering at Princeton University.

My research focuses primarily on the physics of semiconductors, with an emphasis on their electronic properties. Of particular interest are the many-body phenomena observed in these low-dimensional structures at low temperatures and high magnetic fields.