

**Massachusetts Institute of Technology**  
**Department of Physics**

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**Condensed Matter Theory Seminar**

“Hydrodynamics of Charge and Energy Transport”

**Ekin Ilseven, ETH, Zurich**

**Abstract:** Hydrodynamics provides a universal framework to describe various physical systems in the long-wavelength and small-frequency limit. There has been a long history of trying to connect hydrodynamics with electronic theory in condensed matter physics, starting with early works in electronic analogues of Poiseuille flow and ultrasound damping in Fermi liquids to its more recent effective use in quantum critical systems. Following the very recent experimental and theoretical developments, we are investigating the role of hydrodynamics in electronic and thermal transport of two dimensional electron gas. After a brief introduction to hydrodynamics and its application in graphene, this talk will focus on two main findings: 1) Viscous flow leads to higher conductance than that predicted by ballistic models; 2) The effect of heat convection in thermal transport, which can create a highly asymmetric temperature distribution in the sample, which can be reversed by changing the direction of applied current.

**12:00pm**  
**Monday, August 29, 2016**  
**Duboc Room (4-331)**