

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

---

**Condensed Matter Theory Seminar**

"Symmetry protected long-lived excitations and tomographic dynamics  
in 2D electron fluids"

**Patrick J. Ledwith**, Massachusetts Institute of Technology

**Abstract:** We will discuss the peculiar collective behavior in two-dimensional Fermi gases arising from head-on carrier-carrier collisions. These collisions dominate at cold temperatures,  $T \ll T_F$ , due to the combined effects of Pauli blocking and momentum conservation. Odd-parity harmonics are protected from these collisions and hence have anomalously long lifetimes. They instead slowly relax via small angle scattering which leads to a strange "superdiffusive" behavior. These long-lived modes give rise to a "tomographic" transport regime dominated by fermionic jets with an unusual hierarchy of time scales and scale-dependent transport coefficients with nontrivial fractional scaling dimensions.

**12:00pm noon**  
**Tuesday, October 16, 2018**  
**Duboc Room (4-331)**

---

Host: Leonid Levitov