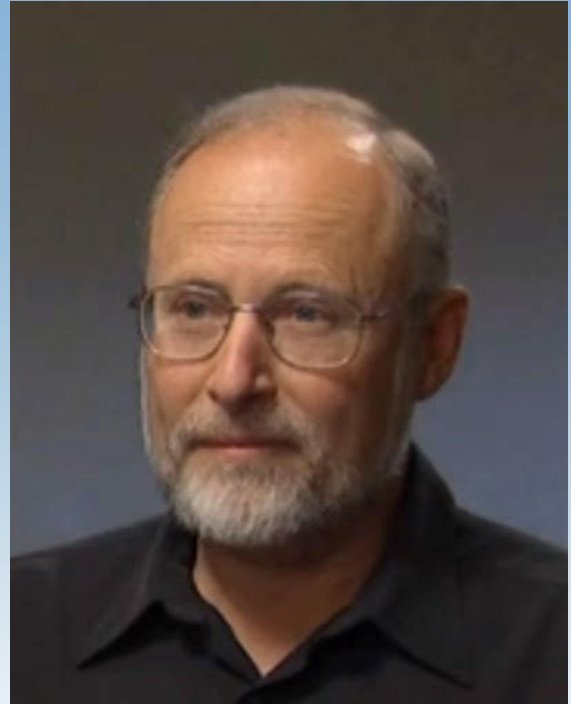


# Colloquium

Thursday, October 22nd, 2026 at 4 p.m.  
Physics & Astronomy Building (PAB) 1-434

**William  
Halperin**  
(Northwestern  
University)



## Superfluid $^3\text{He}$ : Science, Serendipity and four Nobel laureates

The discovery of superfluid  $^3\text{He}$  is a landmark. It is the first unconventional superconductor and serves as a paradigm for search and identification of other odd-parity topological superconductors. This superfluid was first observed serendipitously at Cornell University and then independently confirmed, shortly thereafter. The three superfluid phases evolve from the degenerate Fermi liquid state described by Landau and consist of BCS quasiparticle pairs following the theory of Bardeen Cooper and Schrieffer. This superfluid is claimed to be a model for neutron stars and recently proposed as a possible dark matter detector. The superfluid order parameter structure is intrinsically topological with signature order parameter collective modes that exist in its B-phase. One of them corresponds to a relative broken symmetry, identified theoretically as SBSOS by Anthony Leggett who died in March of this year and to whom we pay tribute. An explicit manifestation of that key symmetry is in the form of a unique transverse sound wave predicted by Jim Sauls and Geneva Moores, observed in my laboratory by Yoonseok Lee including its Faraday effect in a magnetic field, a delightful experimental-theoretical collaboration.

Hosted by Seth Putterman