



復旦大學

Fudan University



# 復旦大學物理系物質科學報告 Physics Department Colloquium

## Current Development in the Experimental Search for Majorana Fermions in Solid State

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**Abstract:** The search for Majorana fermions in solid state systems is one of paramount research tasks in modern physics today. Majorana fermions are an elusive class of fermions that are their own antiparticles. Although an extensive effort has been made worldwide in particle physics, Majorana fermions have so far not been convincingly discovered in free space. In recent years, numerous theoretical proposals for probing Majorana fermion states in solid state systems have been suggested, ranging from exploring  $\nu = 5/2$  fractional quantum Hall systems, to exploring chiral p-wave superconductor systems, and to exploring hybrid systems of topological insulator thin films in contact to s-wave superconductors. The most recent proposals are to explore the topological superconducting phase of a strong spin-orbit coupled semiconductor nanowire in the proximity of an s-wave superconductor. These proposals have stimulated waves of search for Majorana fermions in solid state. In this colloquium talk, the current achievements in the experimental search for Majorana fermions in solid state systems will be reviewed. A view of future experimental directions in the pursuit of Majorana fermions in solid state systems will also be presented and discussed.

**Time: 2:00pm, Tuesday, June 09, 2015**

**Location: Physics Building, Room 221B**

**(Cookies and coffee will be served from 1:30 pm)**