

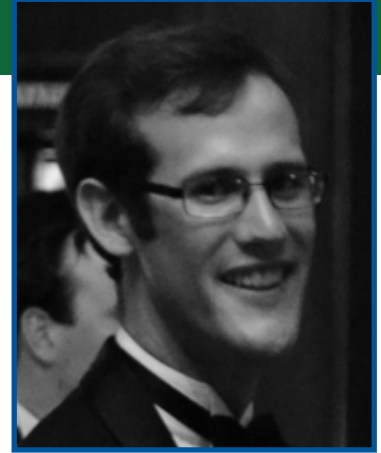
Sean Hart

Graduate Institution: Harvard University

Graduate Discipline: Experimental Condensed Matter Physics

Hometown: Lake Forest, IL

Relevant SC Research: Basic Energy Sciences



Research Interest:

My research has focused on electronic properties of materials at micro- and nano-scales, and the sensitive tools necessary to observe these properties.

This interest has led to a study of charge and heat transport properties in quantum Hall systems. In such systems, charge is transported by one-dimensional channels at the edge of a two-dimensional gapped bulk. Interactions among electrons in these channels can lead to surprising structures, including heat-carrying neutral modes and charge-carrying modes with fractional conductance, even when the bulk is in an integer quantum Hall state.

The discovery of two-dimensional topological insulators has recently opened the possibility to observe similar one-dimensional edge transport without the need for a magnetic field. Under certain conditions, systems such as these are a candidate host for Majorana fermions, and may provide one route to a topological quantum computer.

About Me:

I went to Stanford University for my undergraduate education, where I worked on studies of superconducting sensors for the Cryogenic Dark Matter Search. Currently I am a graduate student in the lab of Professor Amir Yacoby at Harvard University. There, I have worked on experimental probes of edge modes and excitations of fractional quantum Hall states. More recently, I have concentrated on studying transport properties and engineering of HgTe/HgCdTe quantum wells.



U.S. DEPARTMENT OF
ENERGY

Office of
Science