Curriculum Vitae

Name: Hao Li
Date of Birth: 04/18/1996
M/F: Male
E-mail: hl3270@nyu.edu
Tel: +1-646-239-1960

CQP, Department of Physics
New York University
10th Fl, 726 Broadway
New York, NY, 10003

Education:

- 09/2014-07/2018 — B.S., Peking University (Physics)
- 09/2018-present — M.S., New York University (Physics)

Research Experience:

- 09/2017-07/2018 — Peking University, Beijing, China
  Undergraduate research & B.S. thesis
- 07/2019-present — New York University, New York, NY, USA
  Graduate research & M.S. thesis

Summary of research:

In my undergraduate thesis research, we grow $LaMnO_3$ epitaxial thin films by PLD, and heat part of them with electron beams to see if a change occurs in its magnetic properties. By measuring the magnetic properties of the heated and unheated films with PPMS, we find a clear change of coercive force and phase. The result of XPS further indicate the change of the valence of Mn and could preliminarily explain the change in its properties. E-beam heating therefore can be a possible way of processing thin film devices of magnetic oxide with distinct magnetic properties more easily.

In my graduate research, we study the hybrid semiconductor-superconductor system, $GaAs/NiTiN_3$, a hybrid of an integer quantum hall material and superconductor. With the transport measurement of this hybrid system in strong magnetic field, we try to study the properties of the novel state of matter at the interface of the two materials. Proximity effect has been observed in similar systems, indicating evidences of Majorana zero modes and chiral Majorana Fermions, which may be used for topological quantum computing.

Research skills:

Pulsed Laser Deposition (PLD): Creating ion beams by exposing the target to low-frequency laser, and deposit the ions on substrates posed toward the target. It is used to grow metal or metal oxide thin films with a controlled thickness.

Molecular Beam Epitaxy (MBE): An atomic layer by atomic layer single crystal growth technique, based on molecular or atomic beams with a heated crystalline substrate, performed in an ultra-high vacuum (UHV) environment. It is used to grow high quality thin films with control of the thickness, doping, and composition, of materials including semiconductors.

Ultra-violet photoetching: It is used to process devices without extremely precise structures in a faster and easier way.

Ion/electron etching: Etching by directly expose samples to ion/ electron beam. It is used to process devices whose materials cannot react with etchant or with fine structure, of even less than 1 nm wide.

X-ray diffraction (XRD) & Raman spectrum: To study the microscopic structure of materials.

Magneto-Optic Kerr Effect (MOKE) & Hall Effect measurement: To study the magnetic properties of materials.

Physical Property Measurement System (PPMS): To measure many kinds of physical properties of materials, including magnetic properties.

Transport measurement: With Oxford Instrument Teslatron, to measure the transport properties of 2D materials in strong magnetic field

Programming skills:

Language: C, python

Quantum computing: Qiskit (quantum programming with IBM facilities)

Undergraduate thesis:

- Effect of Electron Beam Irradiation on the Magnetic Properties of Two-Dimensional LMO Thin Films Peking University B.S.

Graduate research:

- Novel states of matter at interfaces with focus on hybrid superconductor-semiconductor systems New York University M.S.

Extracurricular activities:

- 03/2017-06/2018 Training in the rowing team of Peking University as a helmsman, and have attended several regattas with university teams from across the world, Princeton and Cambridge for instance. I am qualified to assist the daily training of our team with the coaches, previous Chinese national team members.