Edge Contacts to Atomically-Thin Superconductors

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Introduction

● A qubit’s quantum properties enable them to possess exponentially greater computing power
● Scaling quantum computers is limited, with a single qubit typically occupying > 1 mm² area
● Van der Waals (vdW) layered materials show promise to host next-generation qubits with both long-coherence-time data storage and small areas for better scalability
● High-quality electrical contact is crucial to study the electronic properties of these materials

In this poster we will study edge contact to single atomic layers of the vdWs hBN and MoTe₂

Methods

● We began with exfoliation of hBN and MoTe₂ to extract thin sheets from its bulk crystal
  ○ Due to its air sensitivity, MoTe₂ is exfoliated in the glovebox
  ○ After exfoliation, we search for sufficient flakes under the microscope
  ○ To check the surface we use the AFM

● Once we accumulate sufficient flakes of hBN and MoTe₂, we then stack

● Following stacking, we use Argon (Ar) Milling to etch and deposit onto MoTe₂ in situ at ultra-high-vacuum (UHV)
  ○ This ensures high-quality electrical contact without significant surface oxidation

Results

References

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References