

Introduction

- Superconducting magnets are essential for generating strong magnetic fields to confine plasma in fusion reactors.
- Made from superconducting materials like Nb3Sn and high-temperature superconductors (HTS) such as YBCO.
- Investigation the performance of superconductor REBCO, with varying angle of attack, applied magnetic field strength at low temperatures.

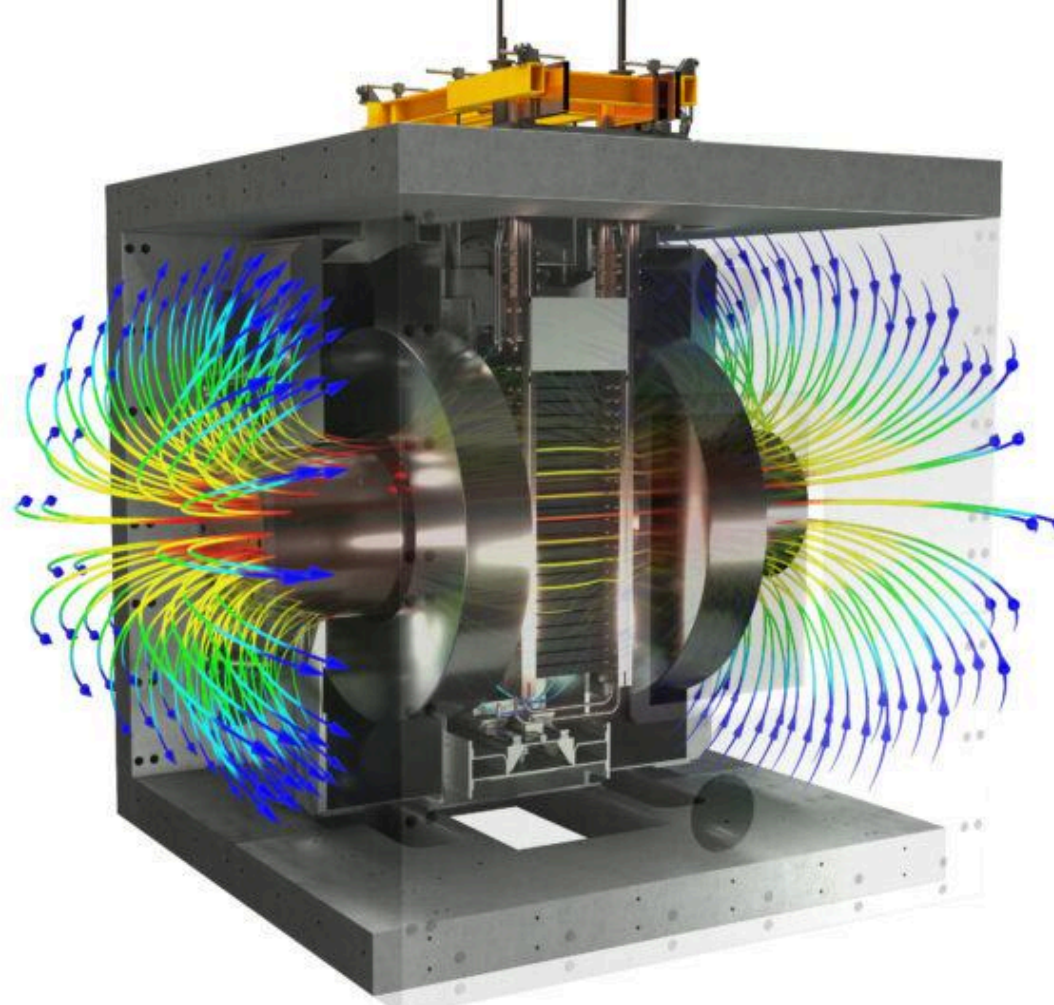


Fig 1: Magnetic field lines for CHIMERA rig [1]

Experimental Apparatus and Methods

Key Apparatus:

1. Ic Probe: Holds the sample, delivers current, and measures voltage.
2. Brass Sample Holder: Secures the HTS tape during soldering and testing.
3. HTS Tape: 80 mm REBCO sample for testing.
4. Polyimide Copper Wire & Pins: For voltage tap connections.
5. Cryogenic Setup (Dewar): Holds the sample in liquid nitrogen.
6. LabView Program: Controls the power supply and records measurements.

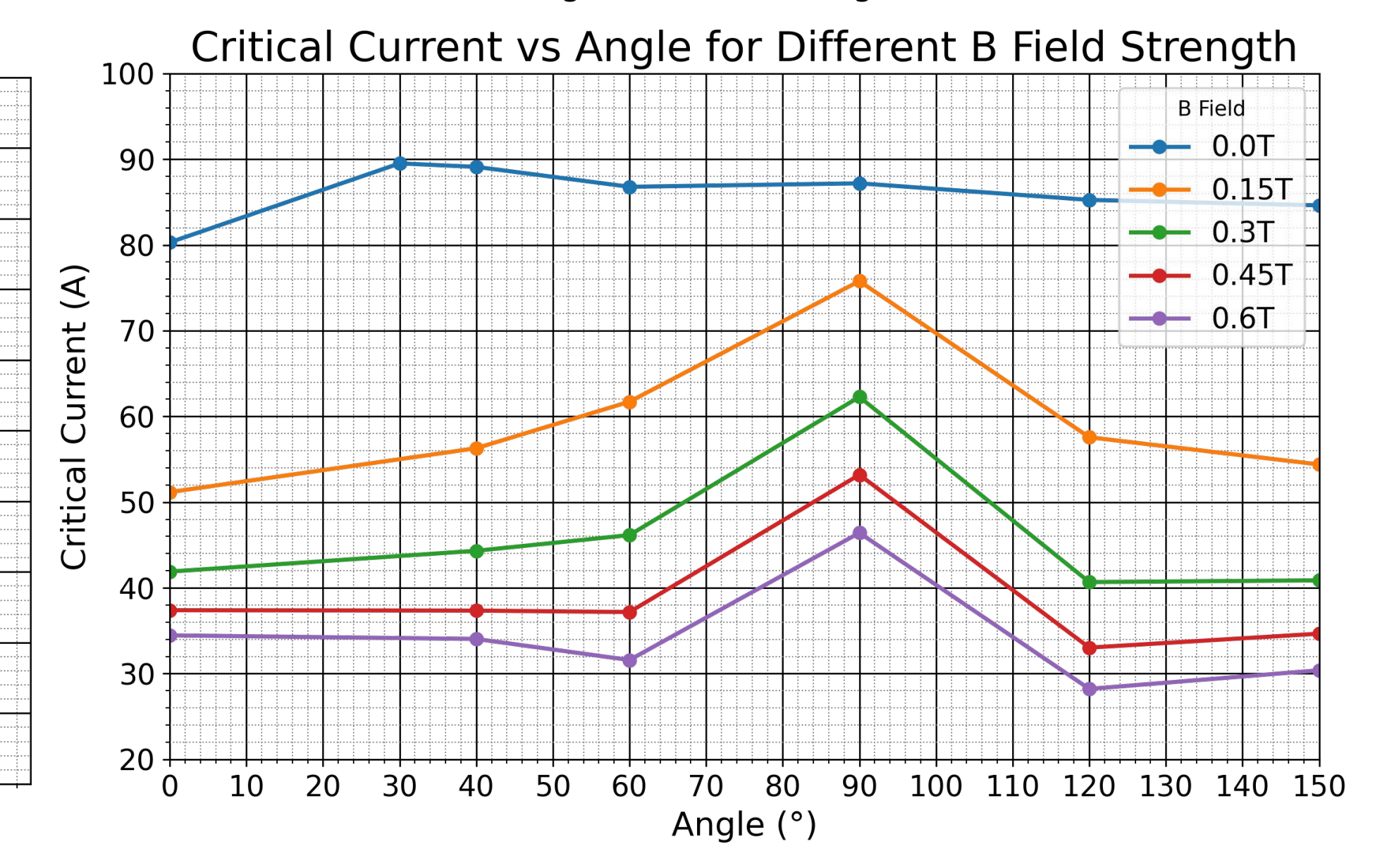
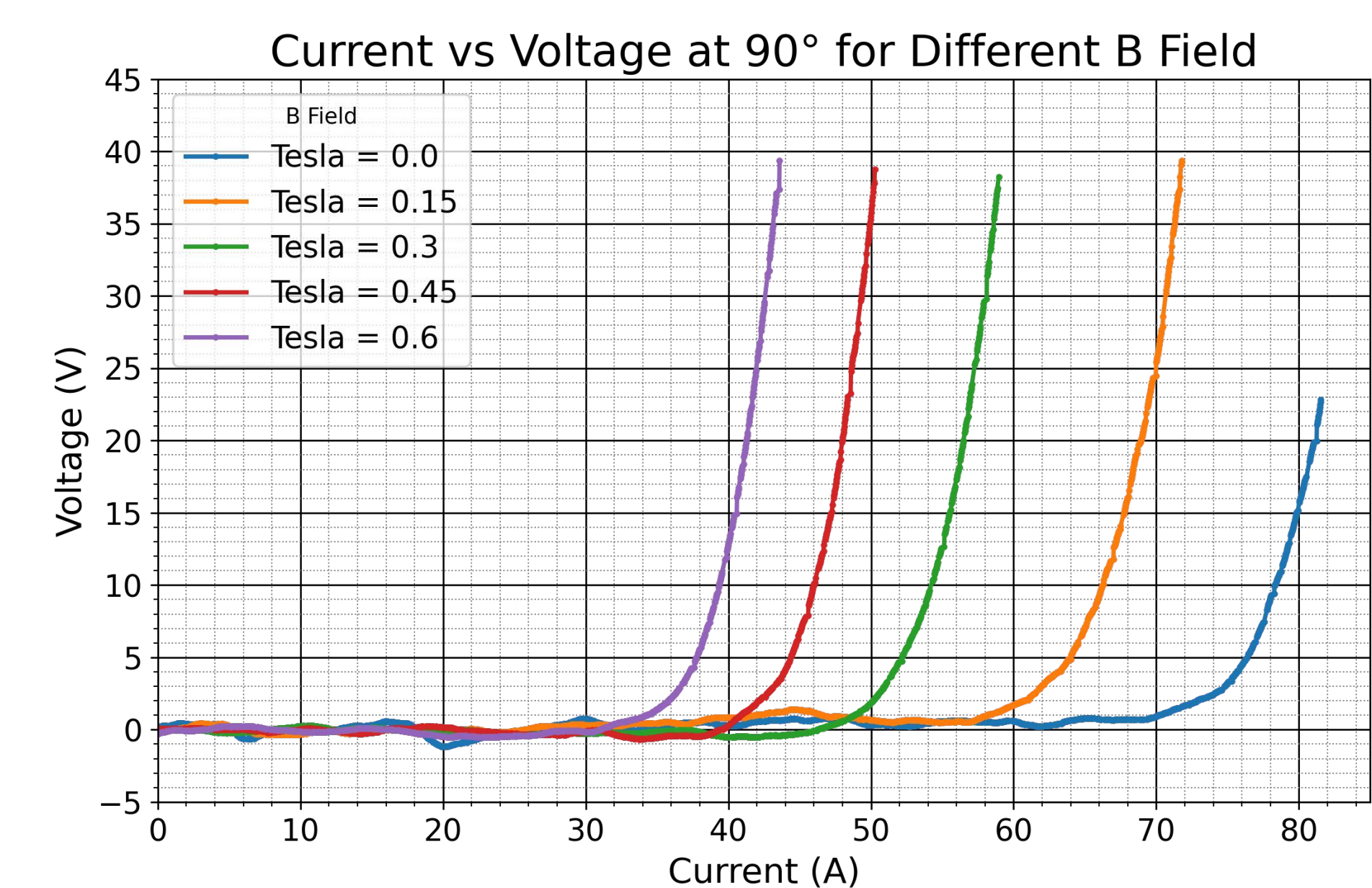
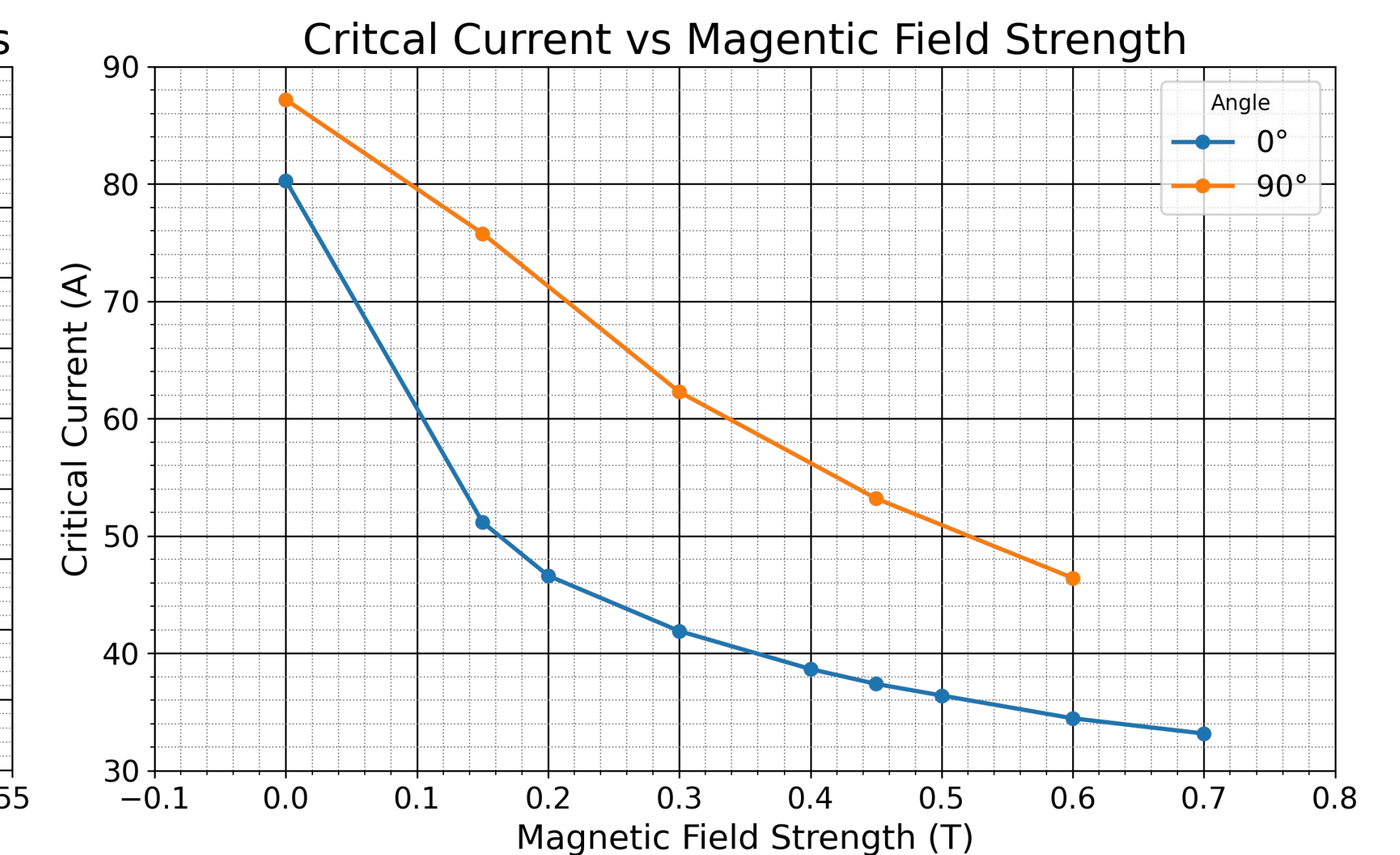
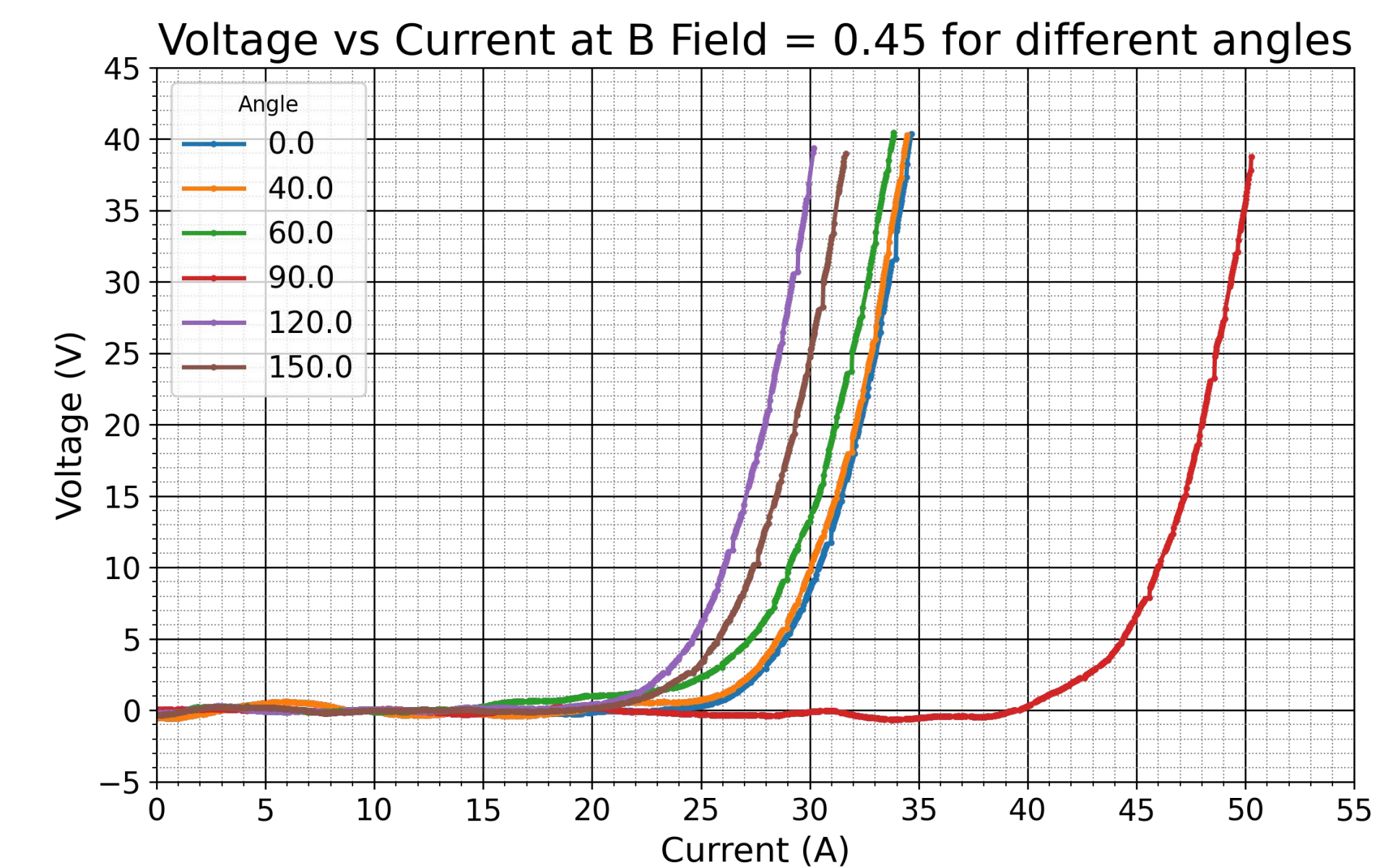


Fig 2: Preparing rig by pouring in liquid nitrogen

Methods:

1. Soldering:
 - Pre-tin the sample holder and HTS tape using soldering flux and lead-tin solder.
 - Attach the HTS tape to the sample holder by heating the pre-tinned areas.
 - Solder voltage tap wires to the sample.
2. Setup:
 - Mount the sample holder on the Ic probe and connect voltage tap wires to the data system.
 - Place the probe in the Dewar with liquid nitrogen and attach the current leads.
3. Ic Measurement:
 - Use LabView software to control the measurement, adjust the magnetic field, and monitor voltage and current.

Results



Results