Fermi National Accelerator Laboratory

Assembly of Multi-Sample Probe

To Measure Critical Current (I_c) of Superconducting Materials.

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At Fermilab's Technical Division the critical current of superconducting materials have so far been measured using probes which only carry one or two samples at a time. The loss of unwanted amounts of cryogen is inevitable when these probes are used to perform tests. However, in order to preserve precious cryogenic material (i.e. Helium), a multi-sample probe which can accommodate eight superconducting strands at a time was constructed. This also allows experimenters to be more efficient in their testing of multiple samples without having to remove the probe from the Dewar to switch the material being investigated. This design saves time, man power and creates a more convenient method of accumulating data. Superconducting strands such as YBCO, Nb-Ti and BSCCO-2212 resting on Fiberglass Laminate (G-10) stages were tested at 4.2K. Probe design, assembly and commissioning of room temperature and liquid nitrogen tests are detailed throughout this paper. Labview software's graphical interface was used to monitor, store and analyze accumulated data.