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Research Project: Superconducting
Current Lead Propagation under Pulsed
Conditions



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Background

- Superconductivity can be defined as a phenomena which results in certain materials to exhibit zero electrical resistance when below a certain critical temperature.
- In order to achieve and maintain such temperatures, the science of Cryogenics is applied, which can be defined as the science that addresses the production and effects of very low temperatures.
- Superconducting applications such as energy storage devices and electric machines require the ability to transmit electric current from the cryogenic temperature region to the normal temperature region. In order to do this, current leads are needed.
- Copper current leads are used to minimize the heat lost through conduction and the heat dissipated due to electrical resistance.



Motivation and Set-Up

- This study will focus on the behavior of superconducting current leads while they are transmitting high magnitudes of current in the form of Pulses and the effect this has over a period of time on the leads.
- This study will involve both an experimental investigation and theoretical computer modeling of the behavior in hopes to develop new understandings of the behavior of the superconducting current leads under these conditions.
- By developing a greater understanding of the behavior of current leads, potential advancements in monitoring and controlling the state of the leads allowing for more utilization of the technology in other applications.



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