



Contribution ID: 601

Type: Poster

Wed-Mo-Po.02-05: Design, Prototyping, Fabrication and Test of the Mu2e AC-Dipole Magnets

Wednesday 2 July 2025 09:15 (2 hours)

Fermilab Magnet Systems is building three High-frequency AC-Dipole Magnets for the Mu2e experiment at Fermilab. These magnets are composed of three single-loop one-meter-long ferrite loaded segments. The excitation consists of a copper tube, which is also used as a means for its cooling with the inherited challenges of Voltage and Frequency uncoupling. These magnets are designed to operate either at 300 kHz or 4.4 MHz via resonance tuning.

Following the completion of the design, prototyping, and analysis phases, all ferrites and other components were procured, and the magnets were fabricated to meet vacuum compatibility requirements using strict procedures. Each magnet undergoes thorough baking and testing before being installed in the experiment.

This paper discusses the magnets' role in proton background suppression as it represents a unique and essential device for the Mu2e experiment at Fermilab. We present the magnet design choices, modeling approach, and the challenges encountered during fabrication. Additionally, we outline the power supply driving mechanism, the testing that was performed, and our results.

Author: ELEMENTI, Luciano

Co-authors: STILL, Dean (FNAL); PFEFFER, Howard (FNAL); PREBYS, Eric; ROBOTHAM, William (FNAL); THODE, Todd; BARAK, Dennis

Presenter: ELEMENTI, Luciano

Session Classification: Wed-Mo-Po.02 - Muon Collider