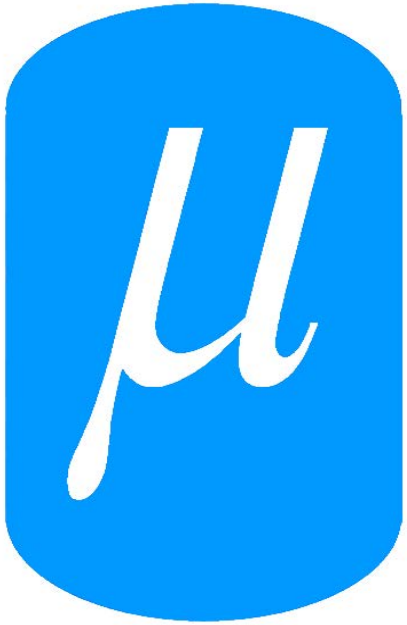
RF Consulting Services at Muons, Inc: Development Cycle of an 805 MHz RF Cavity



Muons, Inc.
Innovation in research

RF Hardware Development Consulting

SLAC NATIONAL ACCELERATOR LABORATORY

Jefferson Lab

Fermilab

DEVICE TECHNOLOGIES INC.

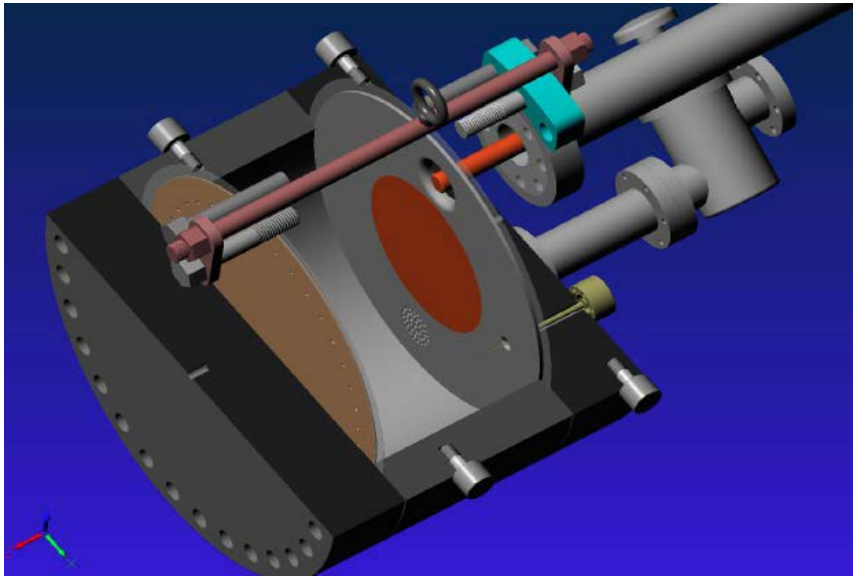
With our collaborators we are developing the enabling RF technologies for the next generation of energy and intensity frontier accelerator facilities.

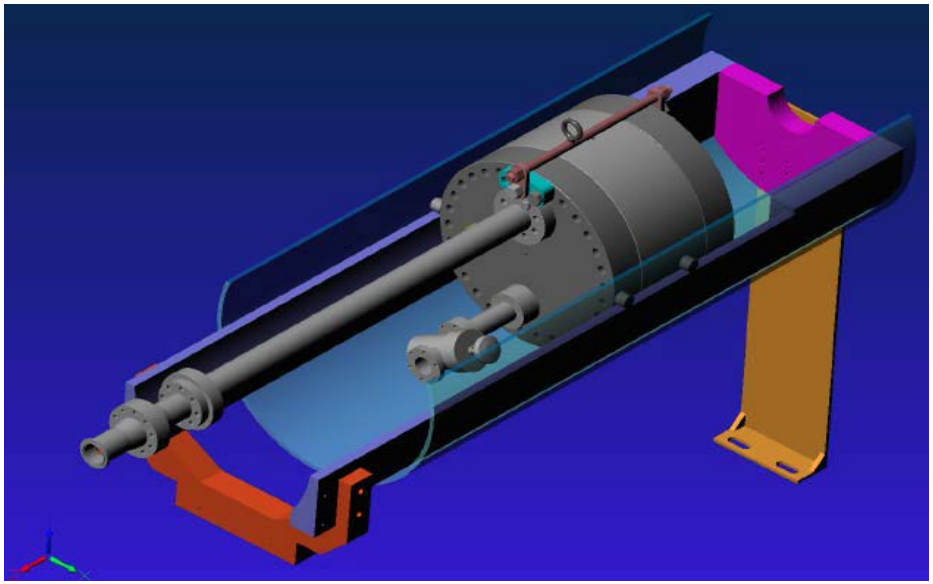
Our RF R&D program services the demanding needs of national labs covering normal conducting RF cavity design and simulation, superconducting cavity design and simulation, higher order mode dampers, and RF power sources for a variety of applications.

The following slide show presents a brief overview of how our experience can helps others navigate the RF component R&D cycle. Presented here is the development cycle for an 805 MHz normal conducting RF cavity designed to operate at 200atm and also in vacuum.

Design

We have many years of design experience and offer expertise in numerous design tools, including ACE3P, CST Design Studio, ANSYS, Superfish, ASTRA.

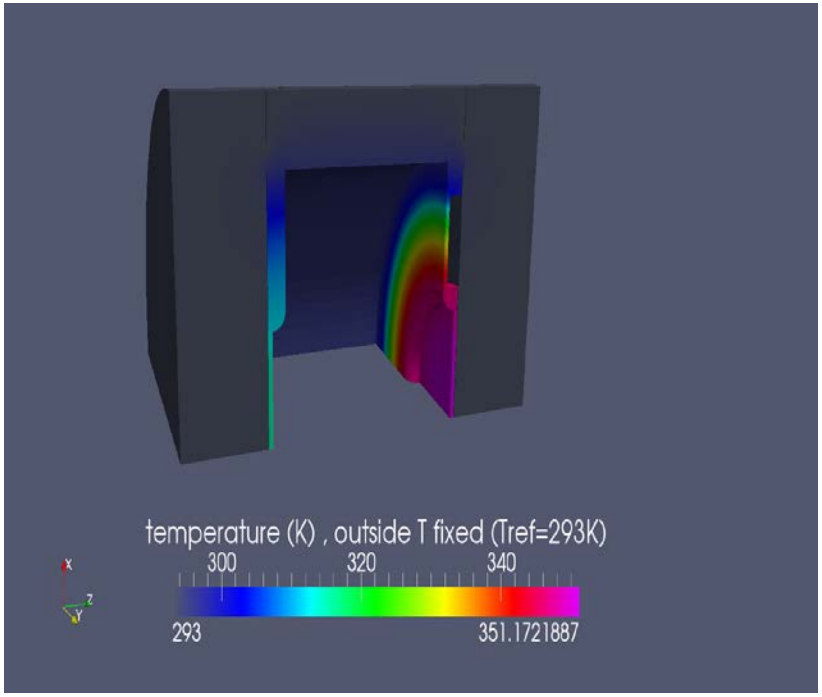


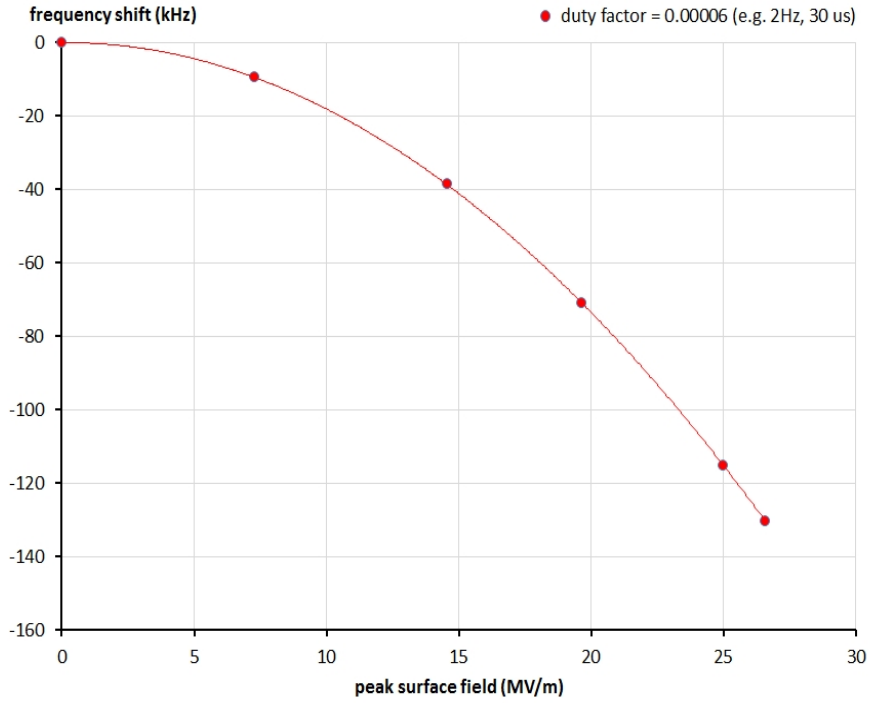


Above is an 805 MHz modular normal conducting cavity that can be operated in either vacuum or with 200atm of pressure. This unique cavity has removable endplates that allow for easy material/fabrication testing.

The following slides look at the development cycle of this cavity.

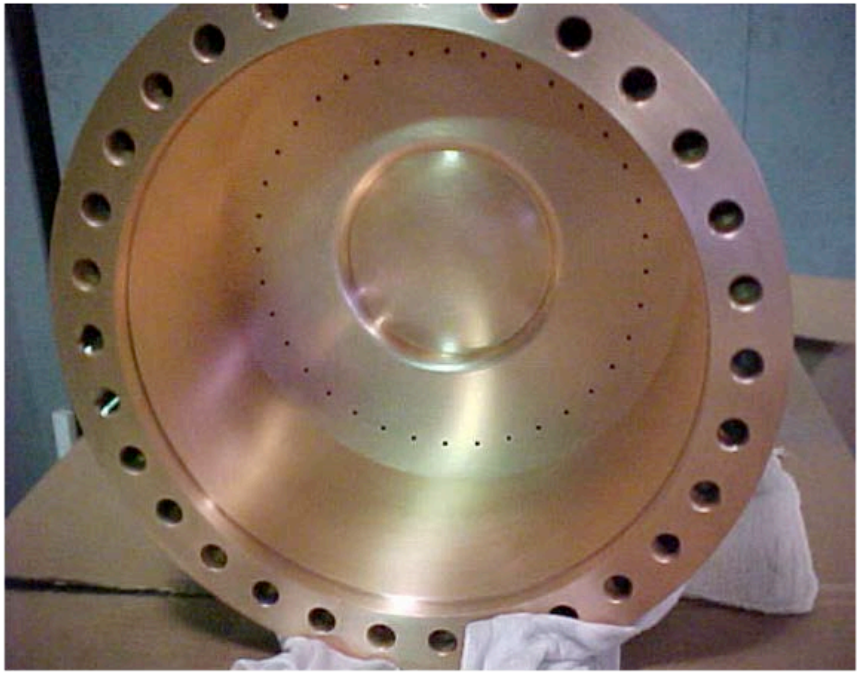
Analysis

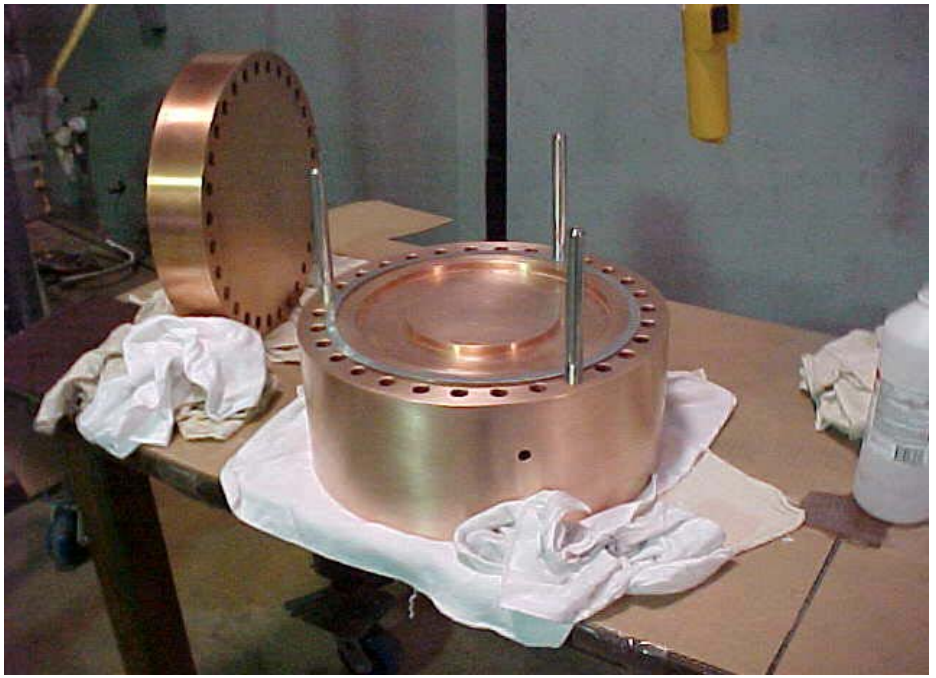




We provide thermal, mechanical, RF (including when necessary multipacting/Field emission/Dark Current), and beam dynamic analysis during the design stage and also on subsequent development iterations or on existing devices.

Fabrication and Assembly

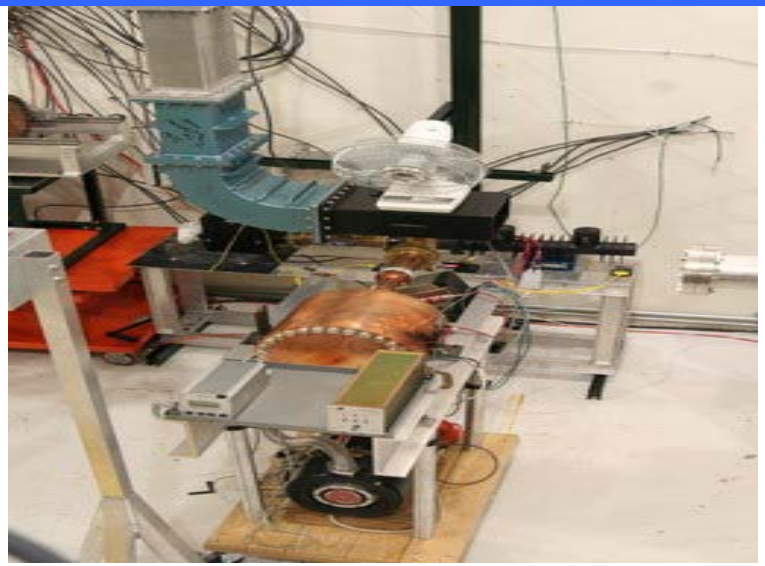




We work closely with our fabrication partners, in this case Device Technologies, to provide a high quality device tailored to the customers needs.

We also manage cleaning and assembly to ensure the product is ready for operation.

Operation

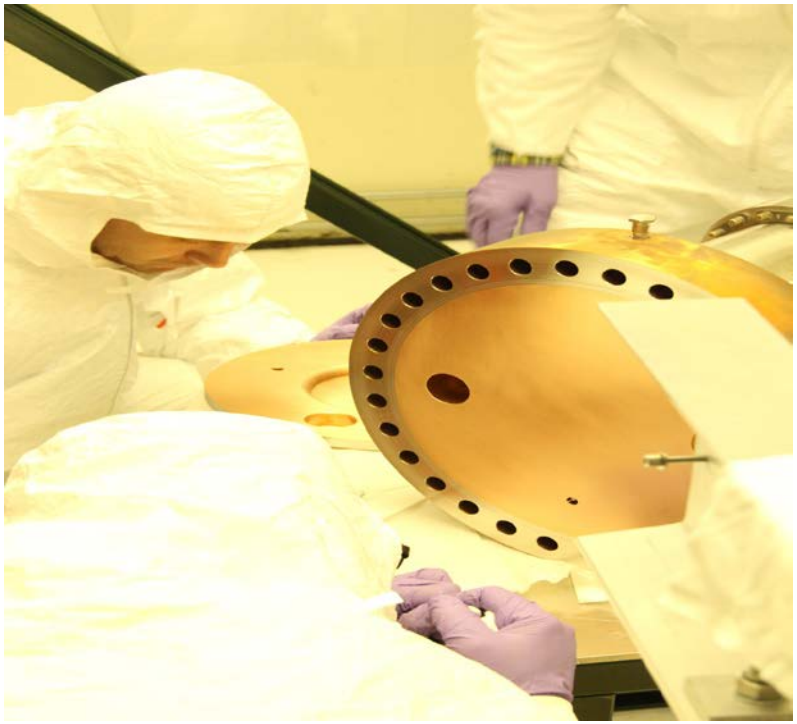


Cavity connected to waveguide in MTA

Cavity installed in bore of superconducting magnet in the MTA

- The cavity was designed to be operated in the Muon Test Area at the Fermi National Accelerator Lab with both a zero Tesla and 3 Tesla background magnetic field.
- Working with our partners at FNAL, Muons Inc. provided vacuum checkout and installation, in the Muon Test Area. Additionally, we provided RF operators for running of this cavity

Post Operation Inspection/Analysis



We work closely with our partners, in this case the Fermi National Accelerator Lab, to ensure our products perform and the project goals are been met. Not only do we provide experts for design, fabrication/assembly and operation, we also provide experts for post-operation checkout of the 805 MHz cavity.