

# **Second Refurbished Booster RF Cavity for 15Hz**

John Reid

July 18, 2012

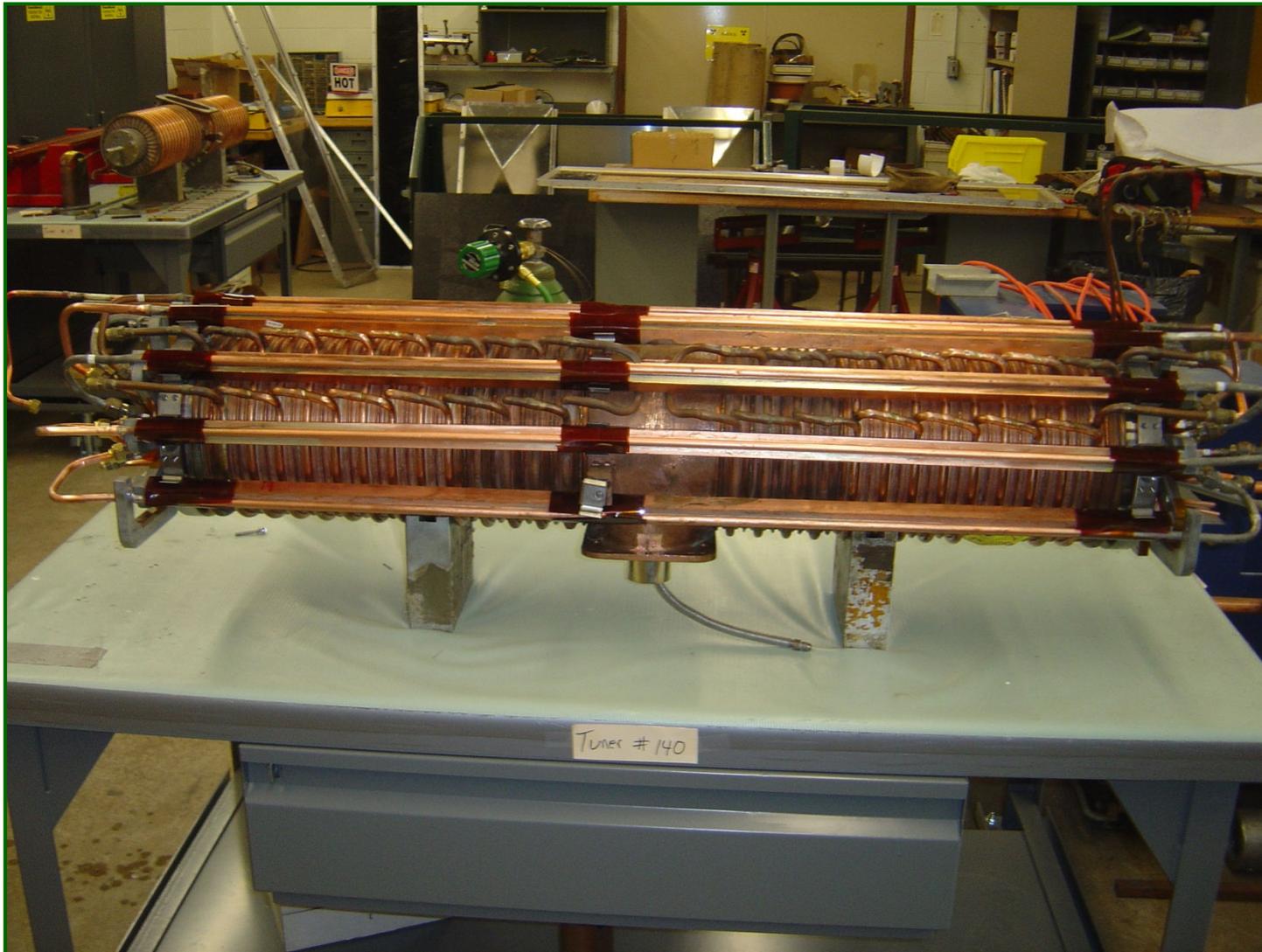
---

- **Booster RF Cavity removed from Station 7 – SN-1011**
  - **Removed May 2, 2011**
  - **Cavity was picked for the following:**
    - **Station 8's cavity ready to install so 7 was the logical choice to pull next.**
    - **Cavity from station 7 is class 3 (radioactive).**
  - **Cavity moved into cave at MI-60 in preparation for disassembly.**
  - **Cavity vacuum leak checked OK.**
  - **Cavity with tuners was assembled with 0.005" tin shims installed on front and back tuner stems.**
  - **Cone cooling connected in series with each ½ of outer ferrite tuner cooling.**
    - **Flow rate in test stand measured 1.5gpm**

- **Center casting single turn cooling flow is 0.8gpm**
- **Had to repair center cooling tube on this cavity due to a water leak that occurred years ago. Repair was successful.**
- **Power removed by water ~ 1.6kW**

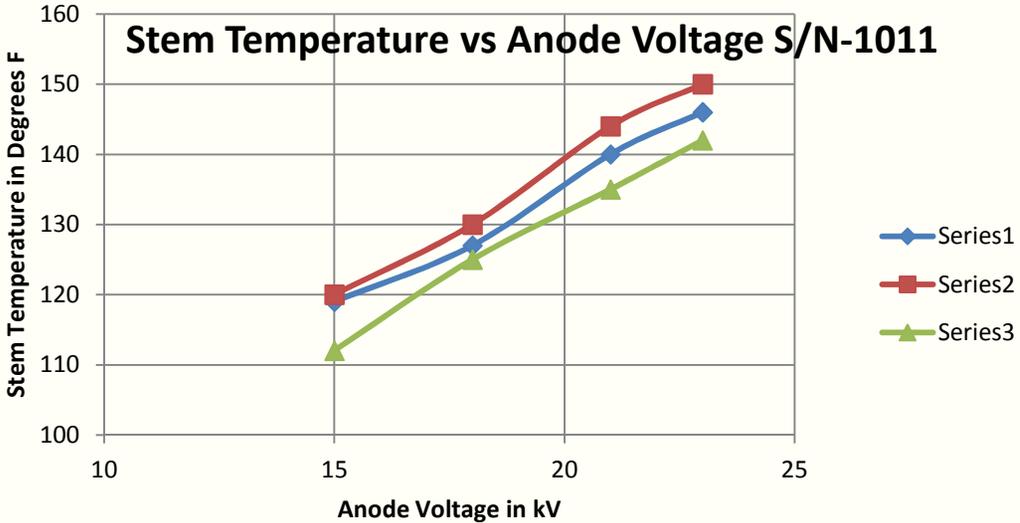
# Standard Ferrite Tuner

Fermilab



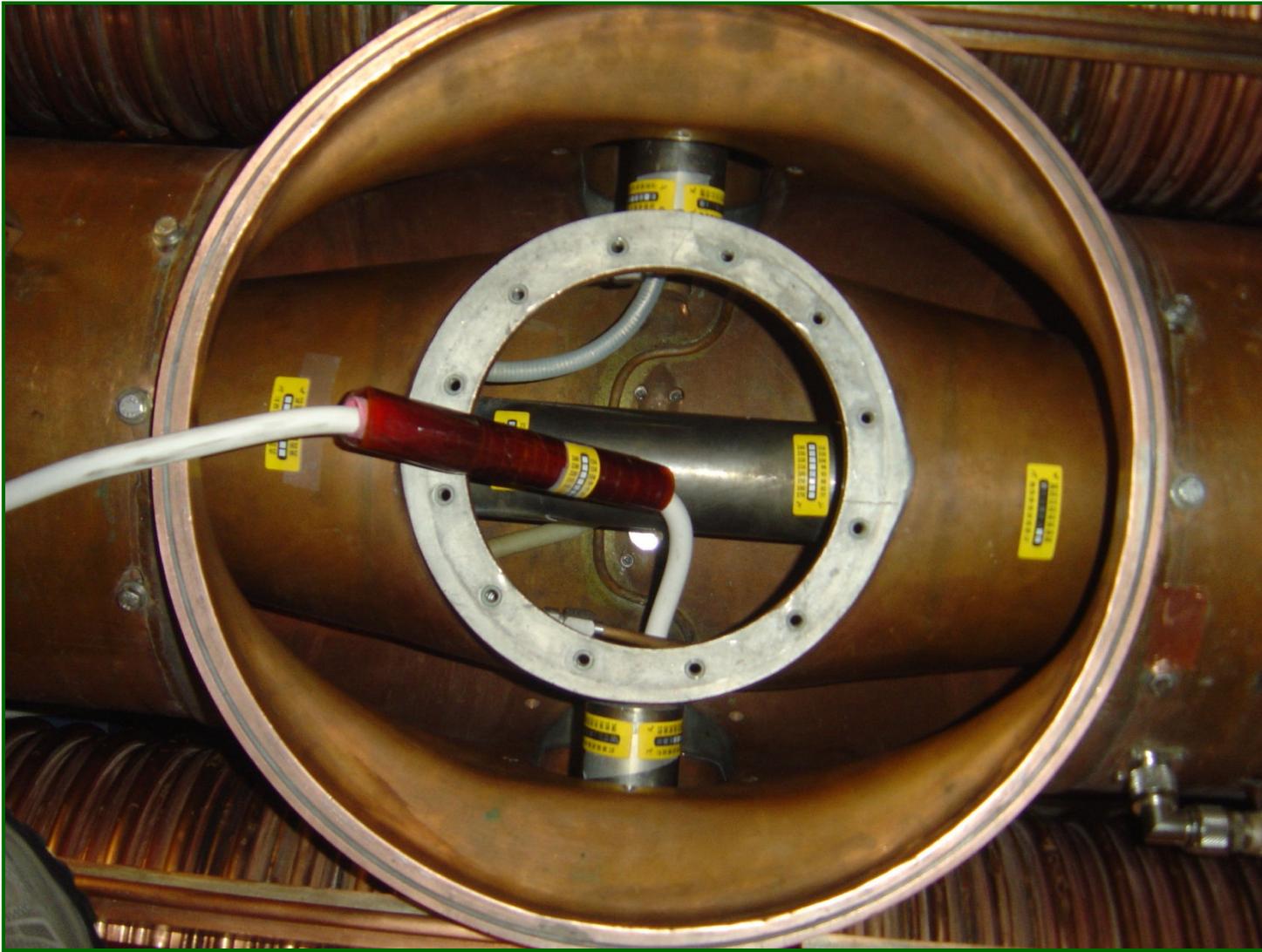
Cavity 1011

Anode Voltage	Tuner Power to water per Tuner	Stem Front Tuner F	Stem Bottom Tuner F	Stem Back Tuner F
15kV		119	112	120
18KV	2.88kW	127	125	130
21kV	5.54kW	140	135	144
23kV	5.8kW	146	142	150



# Inside Center of Cavity

Fermilab



# Anode Blocking Capacitor

Fermilab

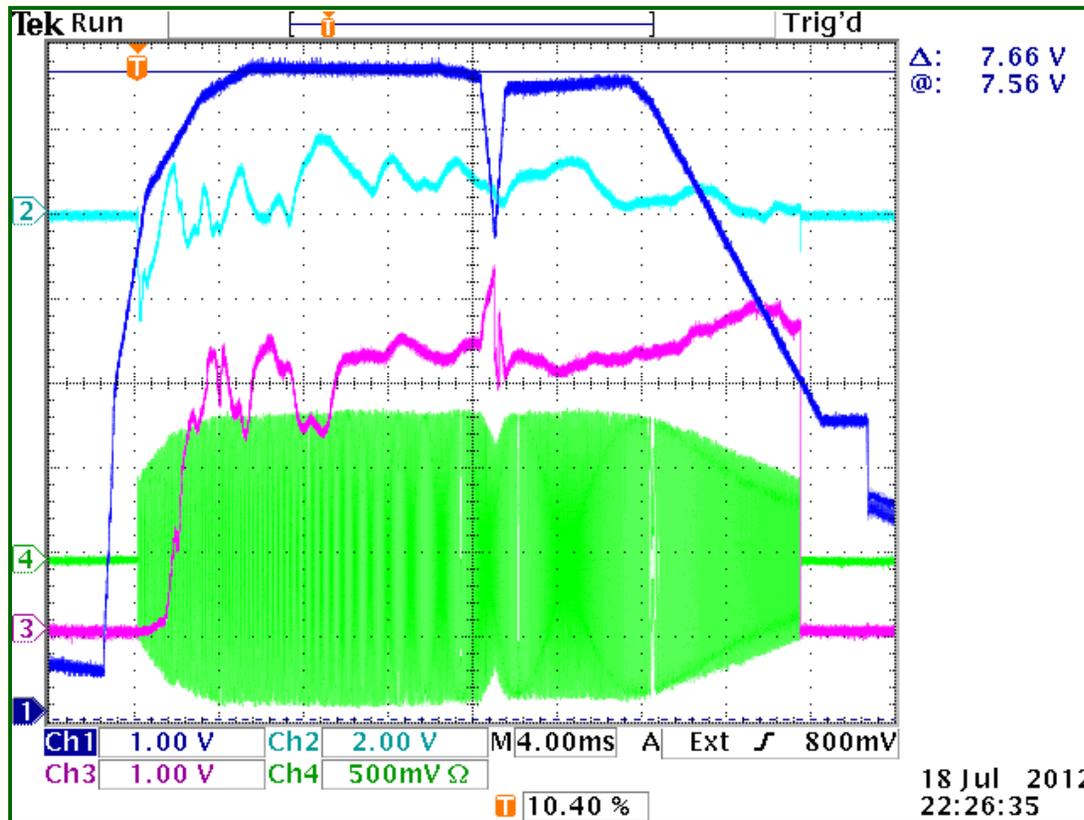


# Anode Blocking Capacitor

Fermilab



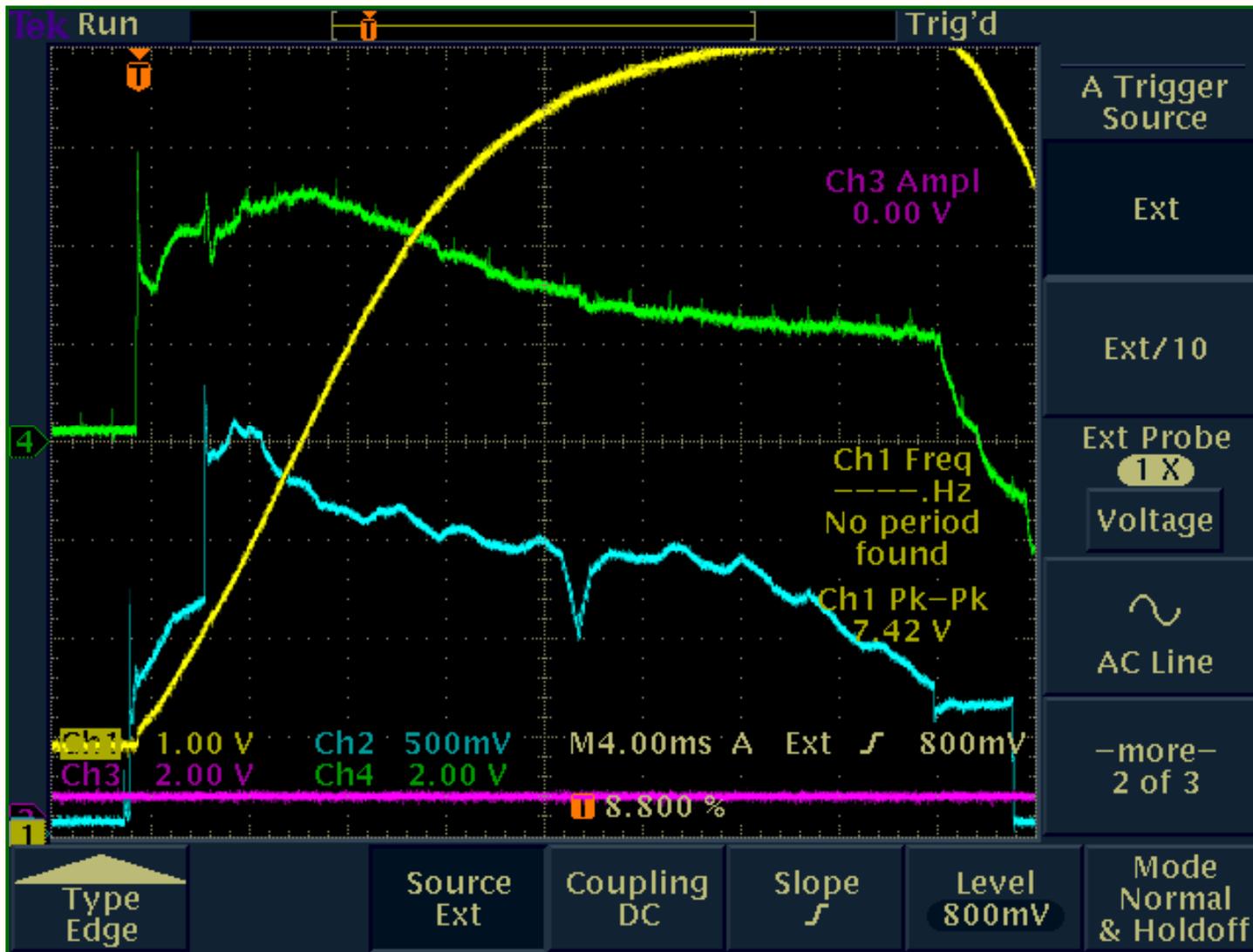
# Std Operating Waveforms



Phase Det Error – Light Blue  
Anode Prog – Blue – 23kVpk  
RF Gap Envelope – Green  
PA Screen I - Purple

# Std Operating Waveforms

Fermilab



FBI – Yellow  
FBV – Green  
Plate I - Blue

# Cavity S/N 1011

- **Parameters at 23kV anode voltage @15Hz for 12 hours.**
  - Gradient ~52.9kV peak accelerating voltage
  - Blocking capacitor temperature = F
  - High voltage filter chokes – F
  - Inside drift tube temperature = F
  - Drift tube temperature = F
  - Beam tube temperature (on Mu-metal shield) = F
  - Cavity outer shell temperature by PA = 114 F
  - Ceramic window outer ring temperature = 110 F
  - Ferrite Power removed to water = 5.8kW per tuner
  - Back tuner stem temperature = 150 F
  - Front tuner stem temperature = 146 F
  - Bottom tuner stem temperature = 150 F
  - Cavity vacuum =  $1.17 \times 10^{-7}$  Torr