

# MTA RF 201 MHz Operations Update

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**MuCool Collaboration Meeting**

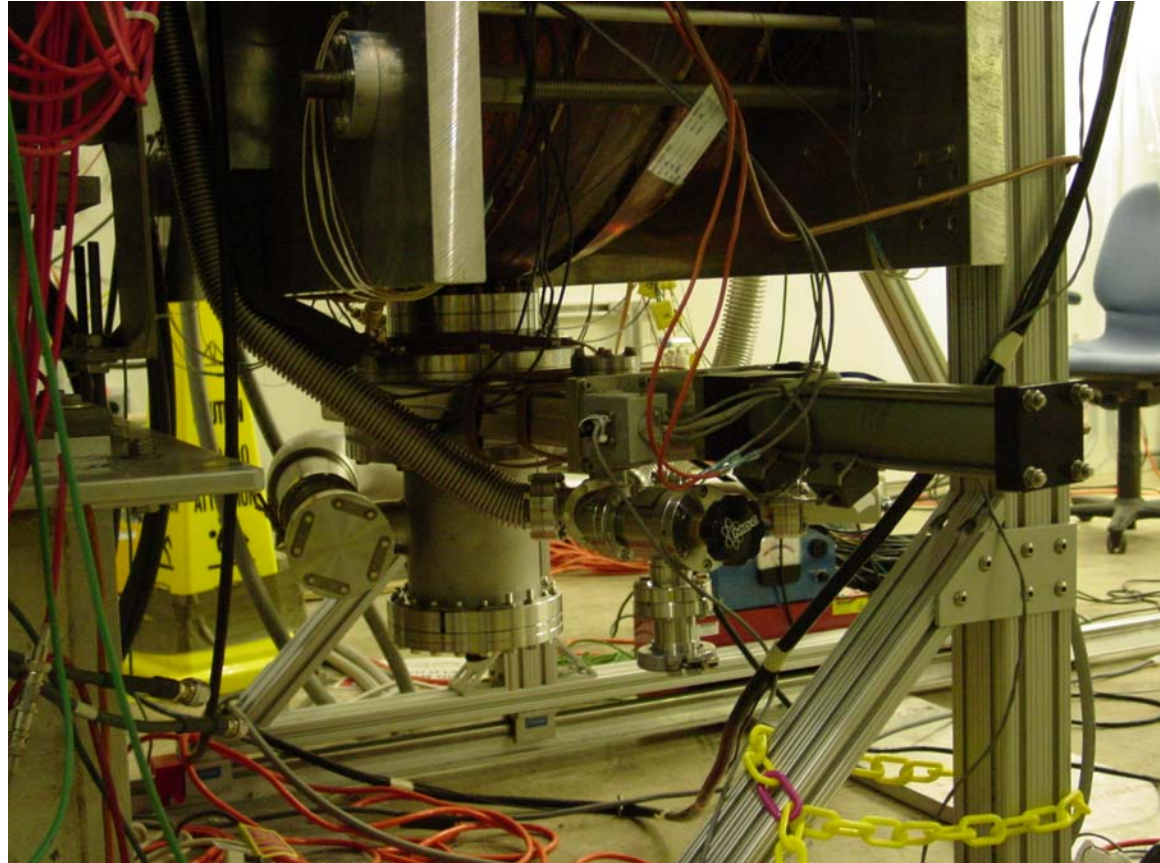
# Outline of Talk

- **View and description of getter pumping system.**
- **Views of movement of the 201 MHz close-up to the magnet; original setup and new setup.**
- **View of typical cavity signals at 9 MV/m.**
- **Some results in Stray Field of the Magnet.**

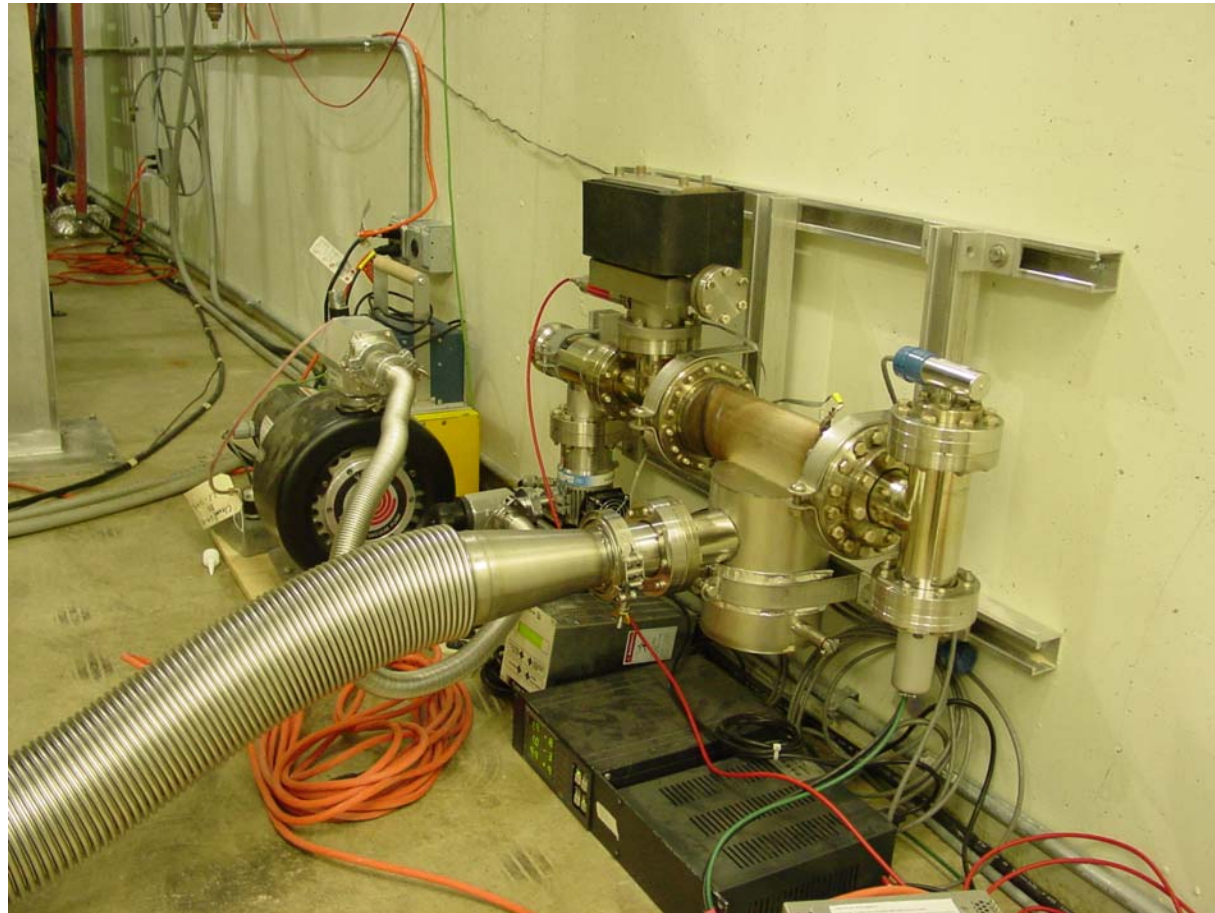
## View of the Getter pump attached the 201 MHz Cavity

### Getter pumping system:

- 1500 l/s Getter pump
- Backed by a 20 l/s Ion pump
- Rough down by a with a Turbo-pump and dry pump.
- Vacuum valves and Ion gages
- System has been running over a month without needing a re-charge
- Has achieved base vacuum level of  $2.5 \times 10^{-8}$  torr.



# View of the Roughing and Ion Pump Stand and Vacuum Flexible Line Connection to the Getter pump.



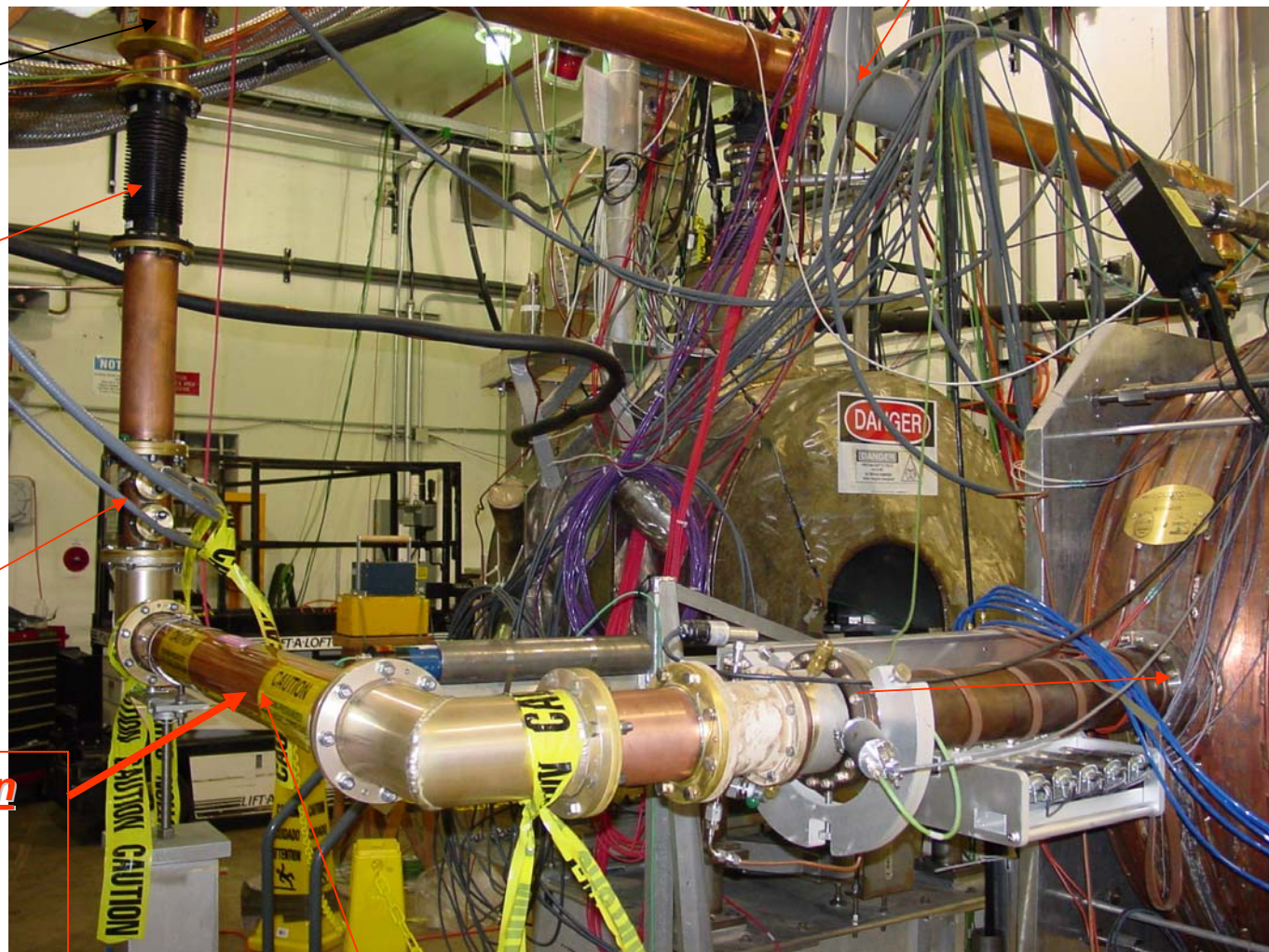
# Picture of the 1 meter Separation between Magnet and 201 MHz cavity

6 1/8" to 4 1/16"  
Transition

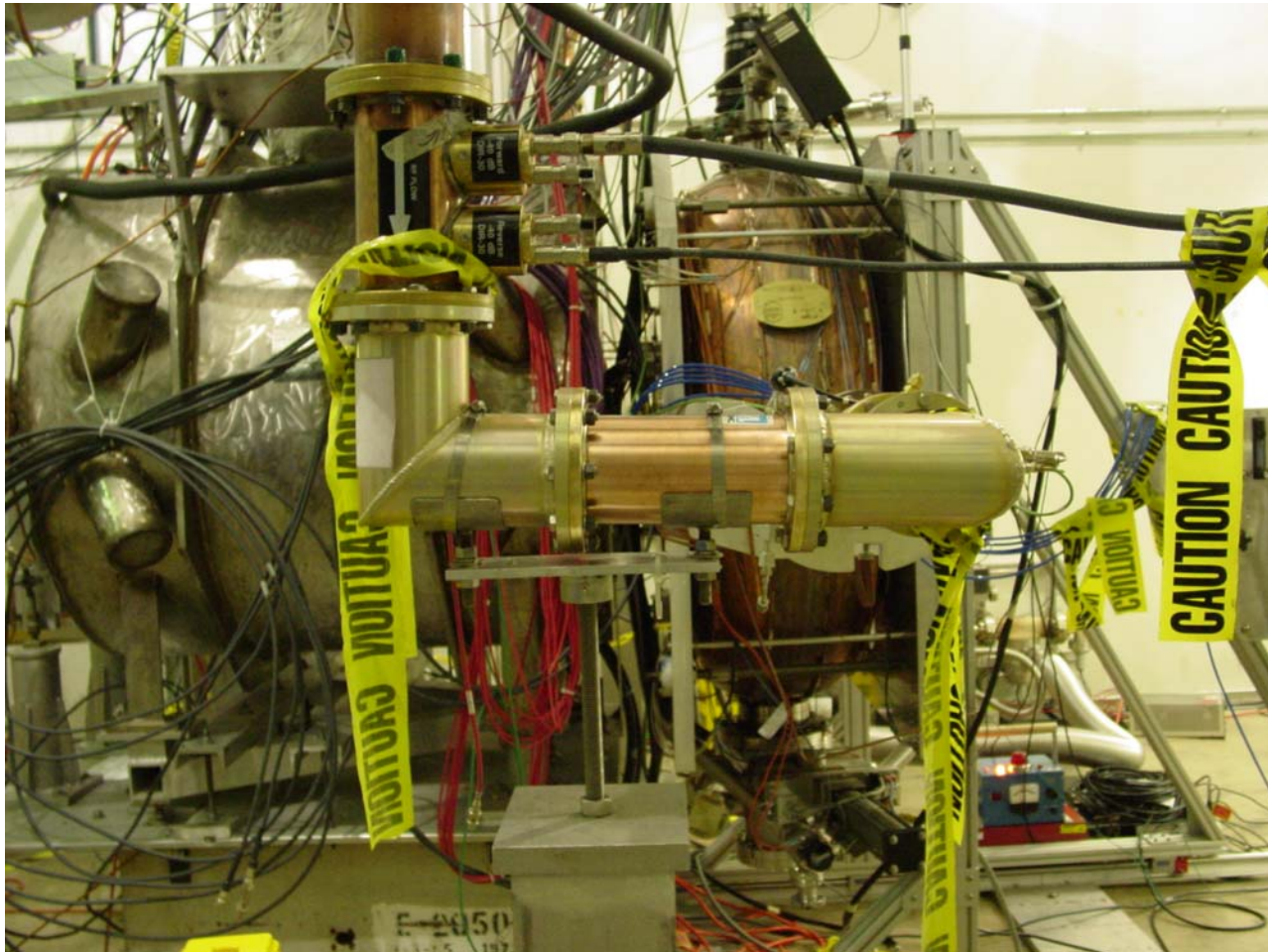
Flexible line  
section

Dual Directional  
Coupler

4 1/16" Coax Section  
that was removed to  
move the 201 MHz  
cavity closer to the  
magnet

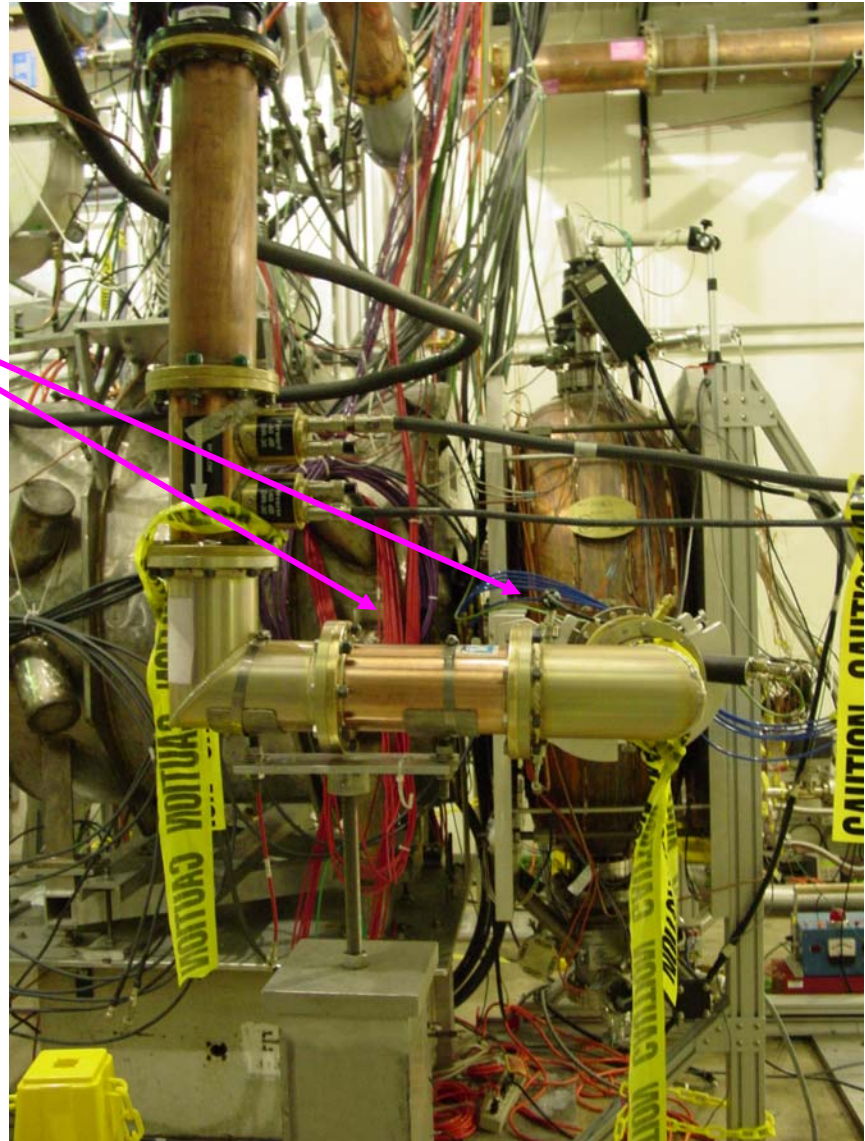


# View of the Separation when 1 meter Coax section was replaced by a 0.2 m section

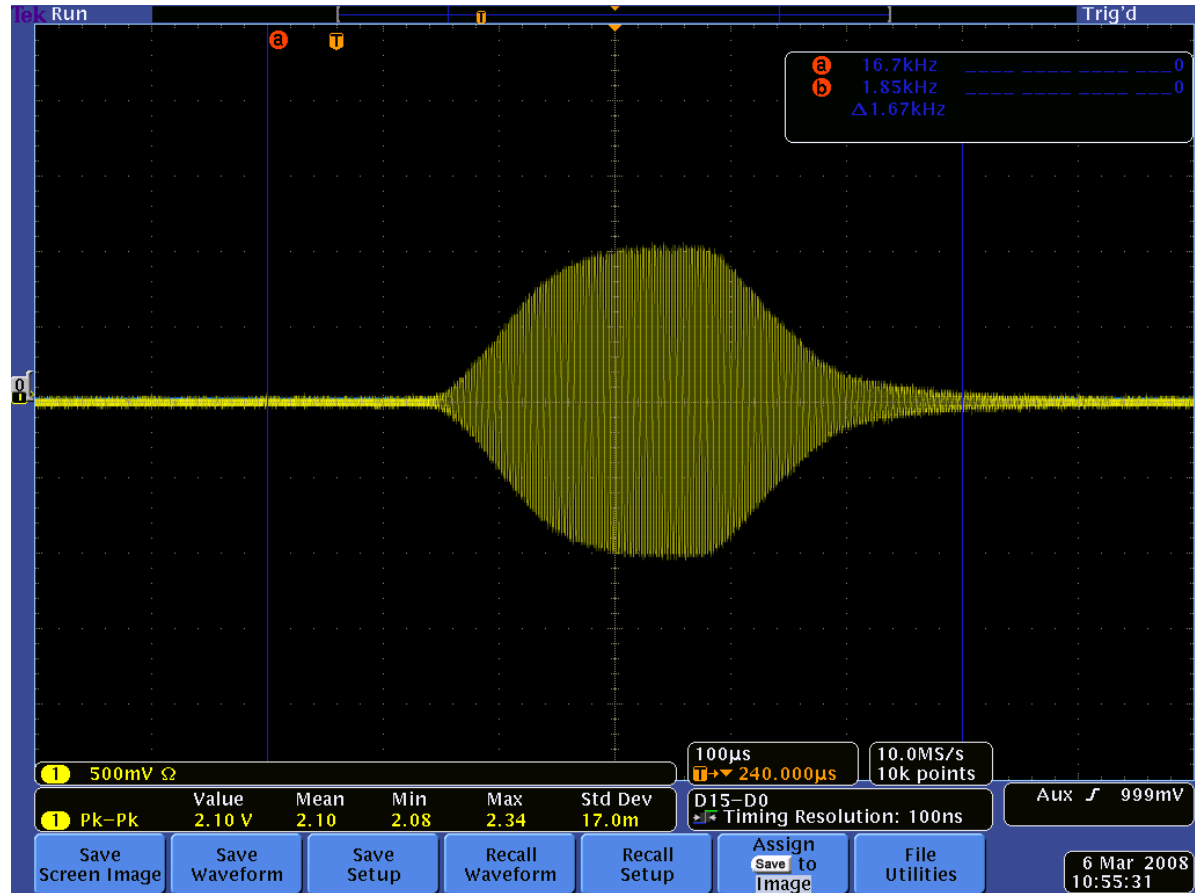


# Another View of the magnet and Cavity

**Separation of  
Nearest Be Window  
from Face of magnet  
now 0.10m;  
Before move 1.1m**

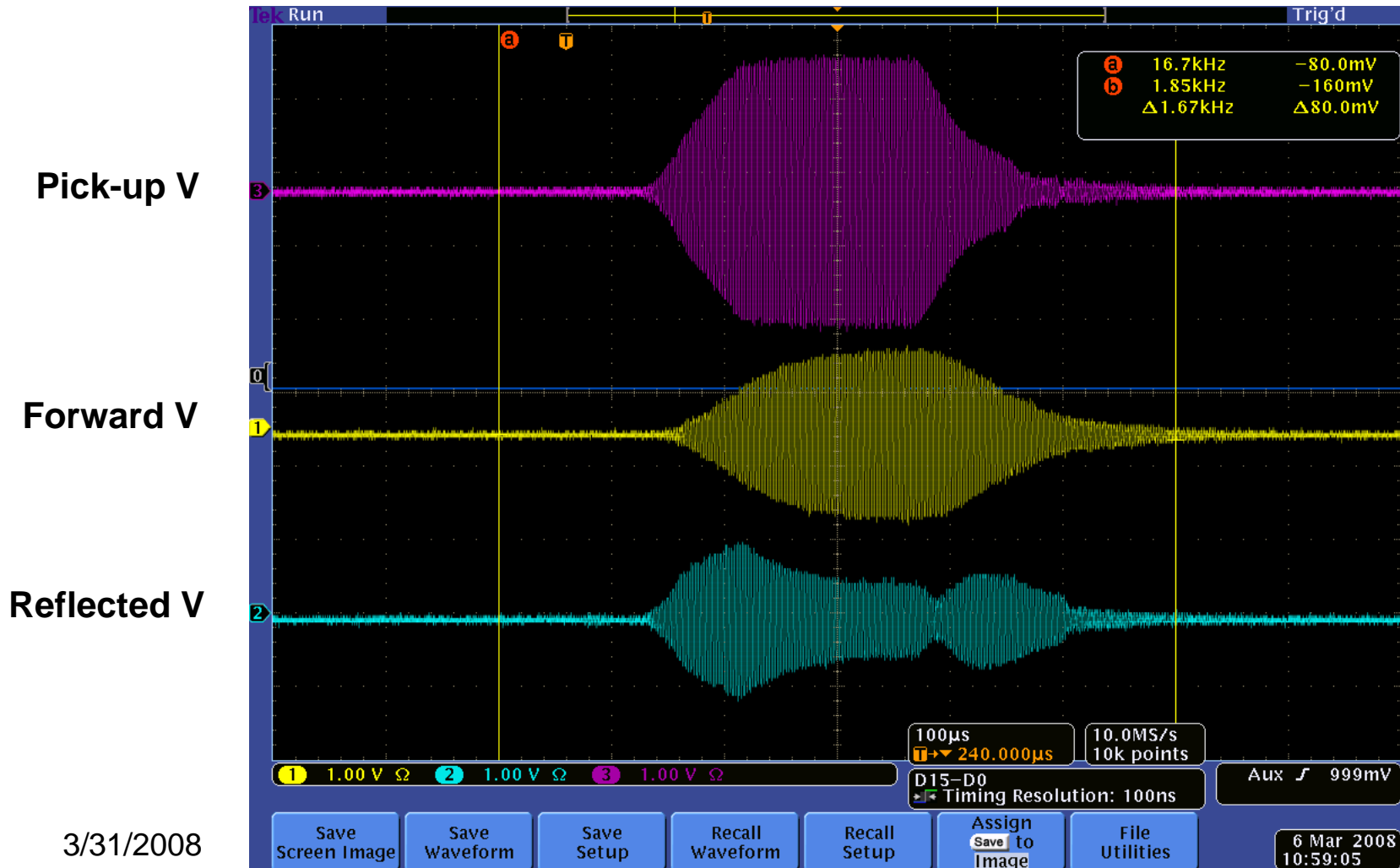


# View of Cavity gradient Pick-Up Signal at about 5 MV/m



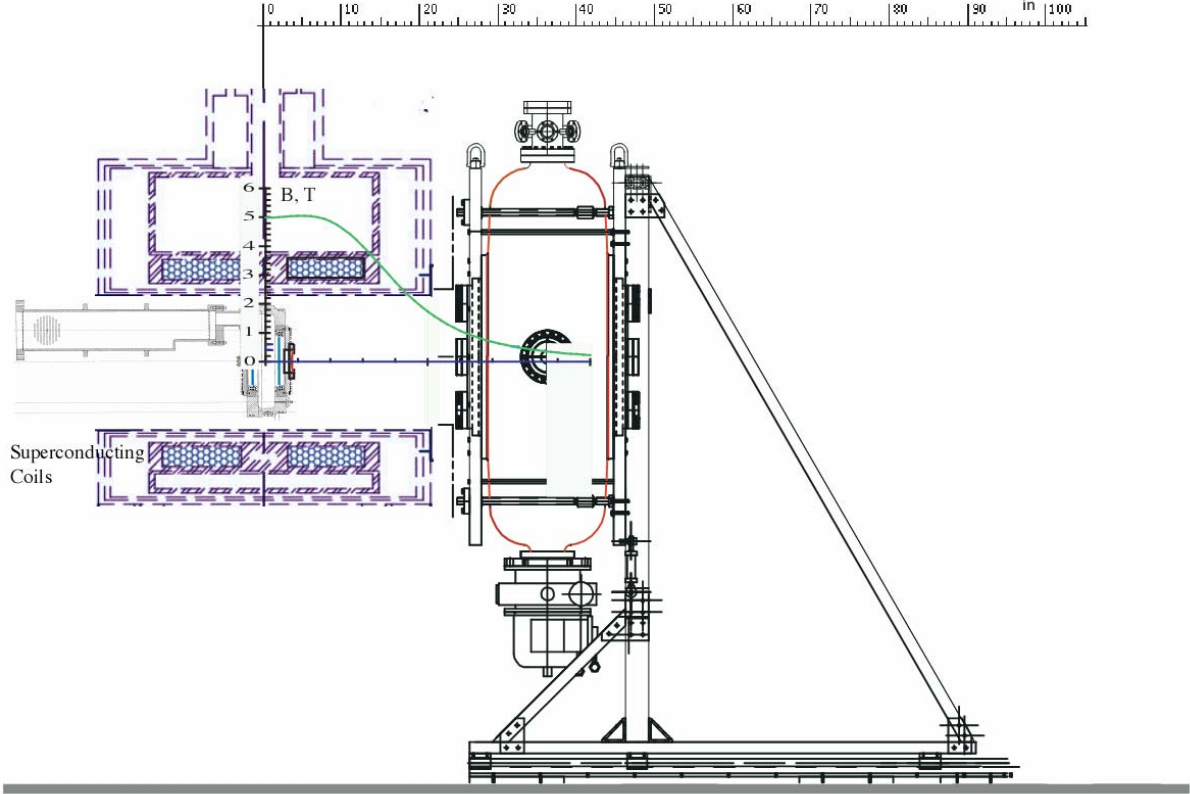


# View of Cavity Pick-up Voltage, Forward and Reflected RF Voltages

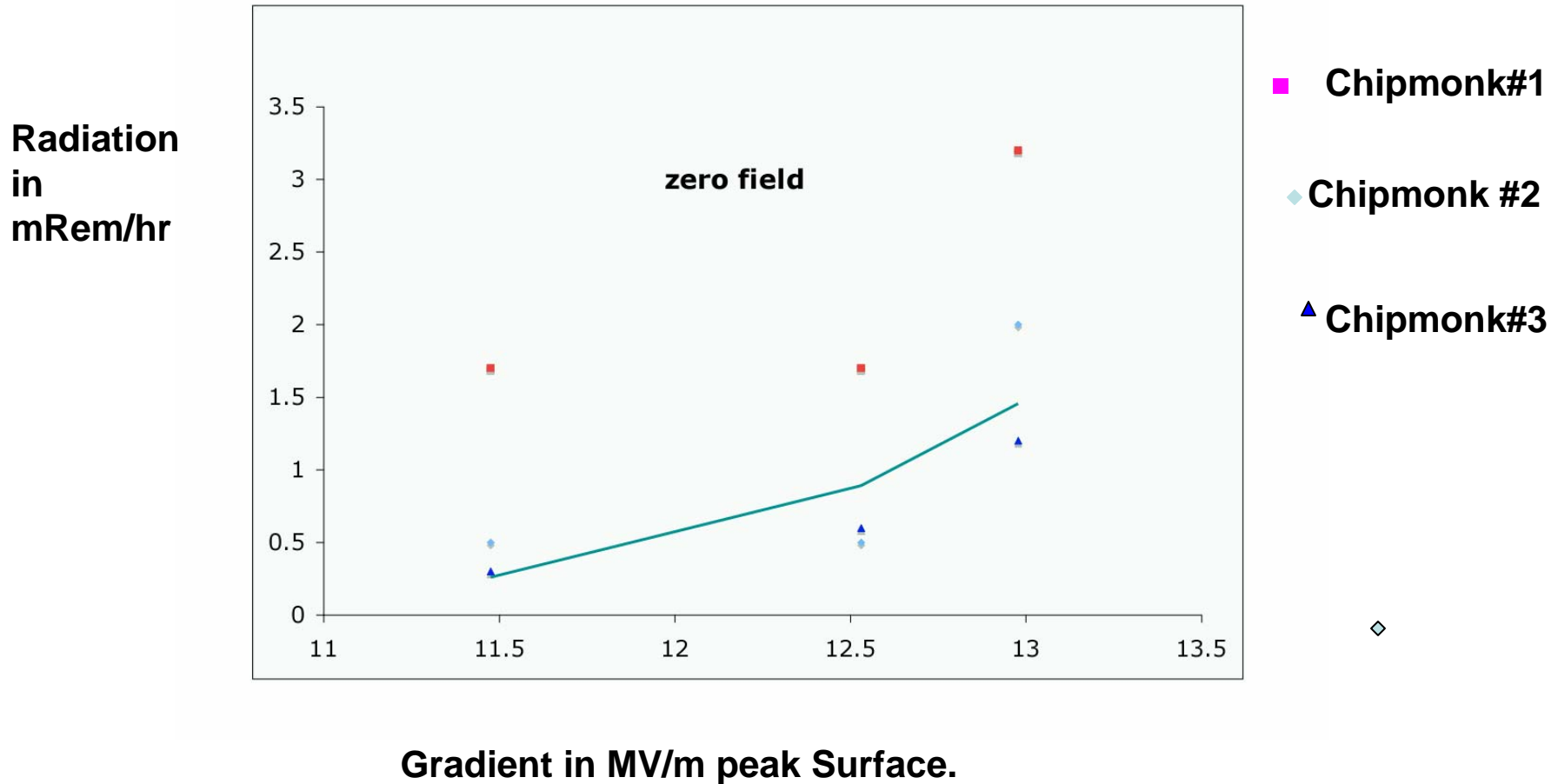


3/31/2008

# Layout of the Magnet and 201 Cavity and field map

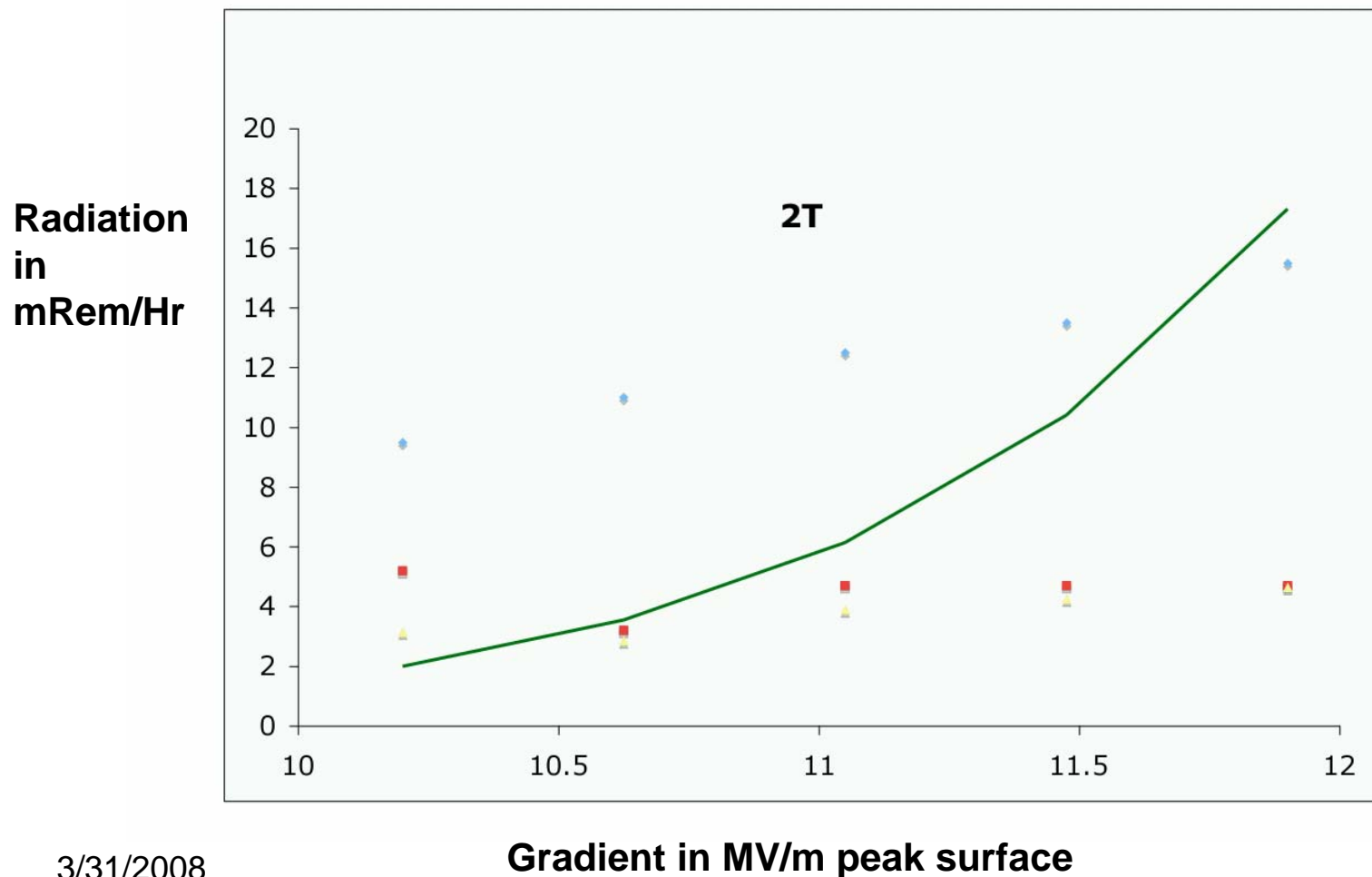


# Fit of the Radiation Data to Gradient to 14 th. Power.



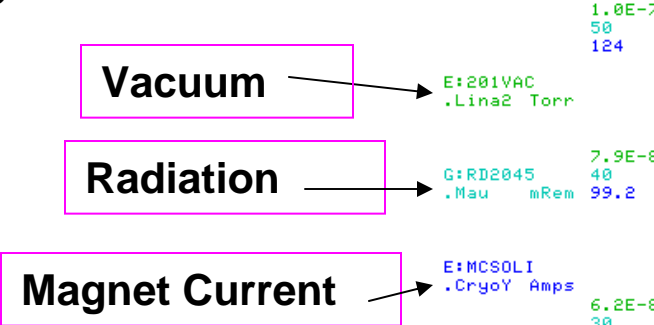
# Radiation at 2T Central Magnet Field

(*Field at nearest window 0.45 T with plot of 14 th. Power law.*)

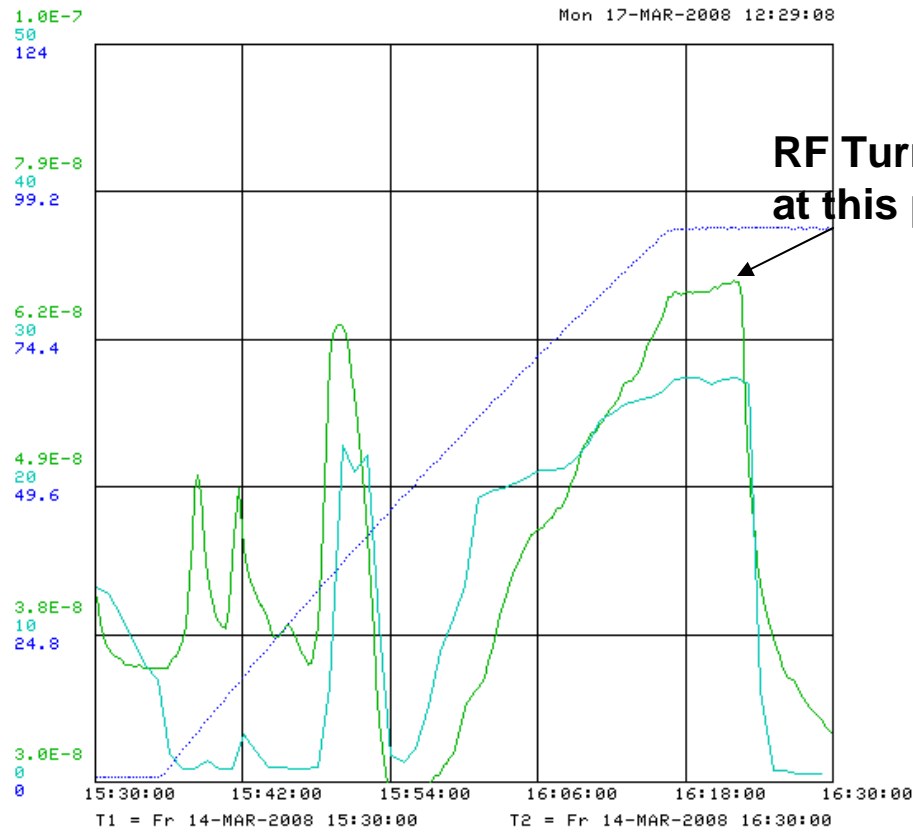


# Correlation Between Vacuum, Radiation and Magnetic Field

Labels Show parameter and scale



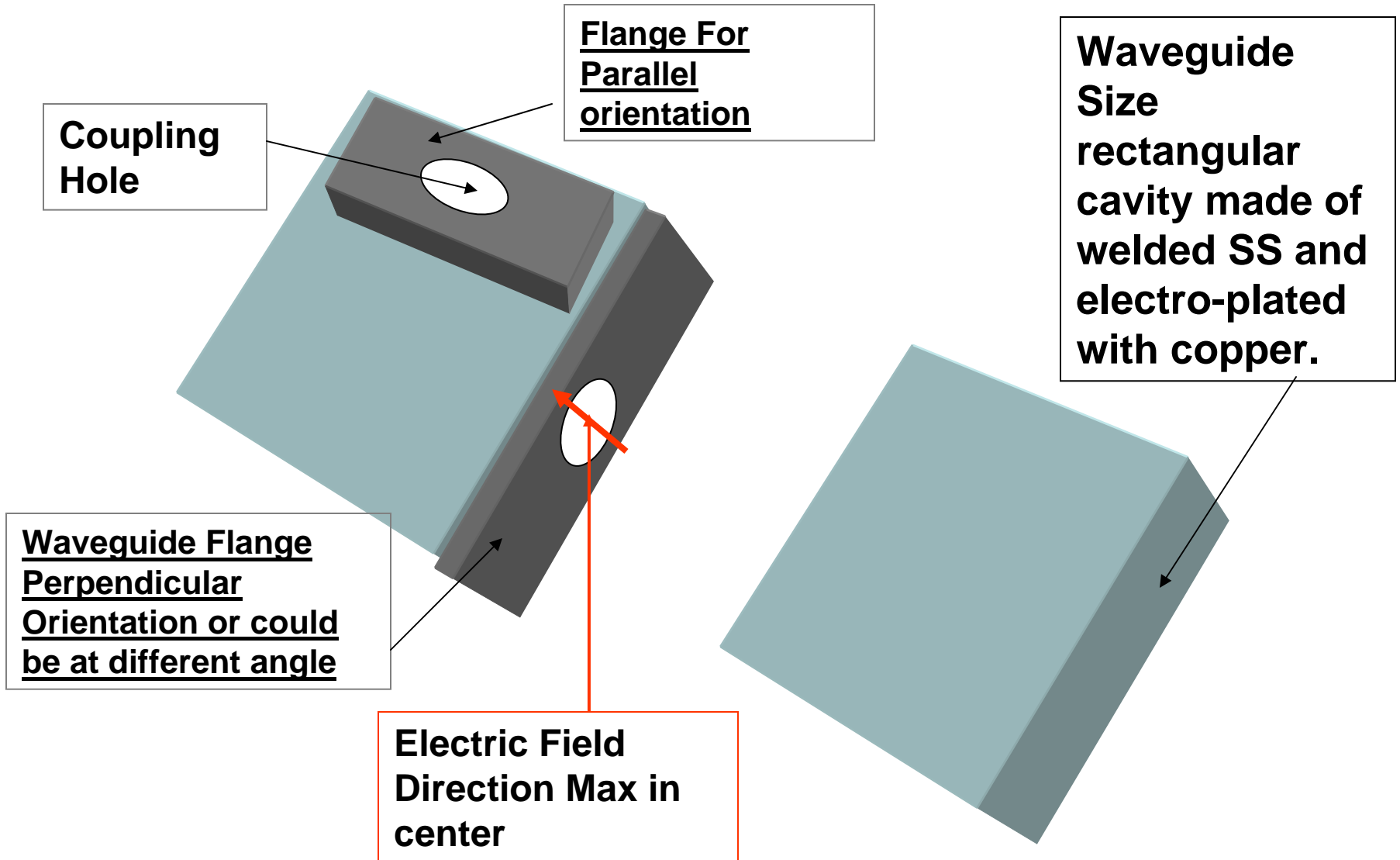
- Shows strong correlation between Vacuum, Radiation and magnetic field due to I believe wide band multipactoring.



RF Turned off at this point.

Time in minutes

Simplified View of Cavity for Field Orientation Studies at Center of the Magnet.



# Results

- The System of the Tube Amplifier, long Coax coupling Line was very unstable; Small tuning changes cause numerous vacuum trip outs. They are coupled together as 3 interacting Cavities. This made it difficult to get consistent and reliable readings.
- There is strong multi-pactoring throughout the entire magnetic field range upto 3.75 T and 1.1 T at nearest window.
- A strong correlation exists between cavity vacuum and Radiation levels. This may explain the lack of the 14 th power law with magnetic field. The strongest effect was at 0.8 T( 0.24 T at window). It was a isolated multi-pactoring resonance. Above 1 T (0.3 T at window) the multi-pactoring was continuous.
- Our best achieved results at 2.5 T (0.75 T) at window was 14 MV/m.
- We will need to commission the 201 MHz cavity much longer to reduce the multi-pactoring before we can properly measure the magnetic field effect in the stray field of the magnet.