

# **MERIT Progress Report**

Collaboration Phone Meeting

September 21, 2007

# Outstanding Issues

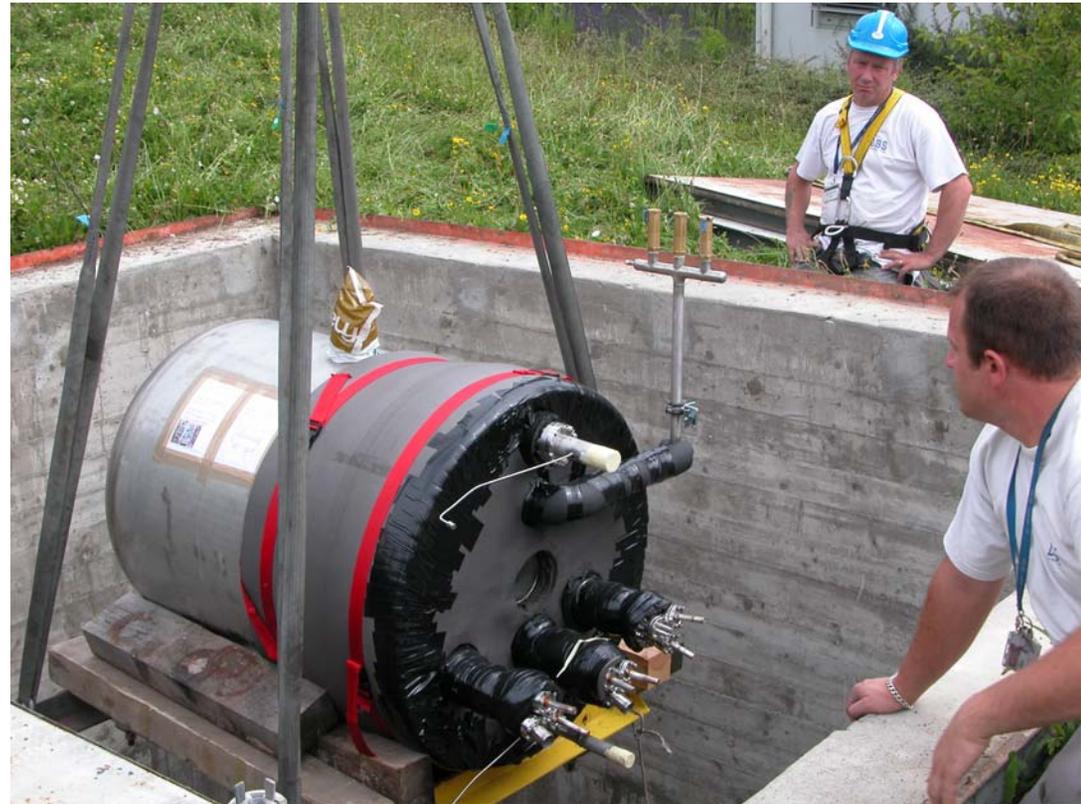
Issues at end of previous (July 6) phone conference

- Installation of the Pulsed Solenoid
- Toward resolving the Access Issue
- Installation of the Cryogenics
- Commissioning of the beamline
- Commissioning of the PS

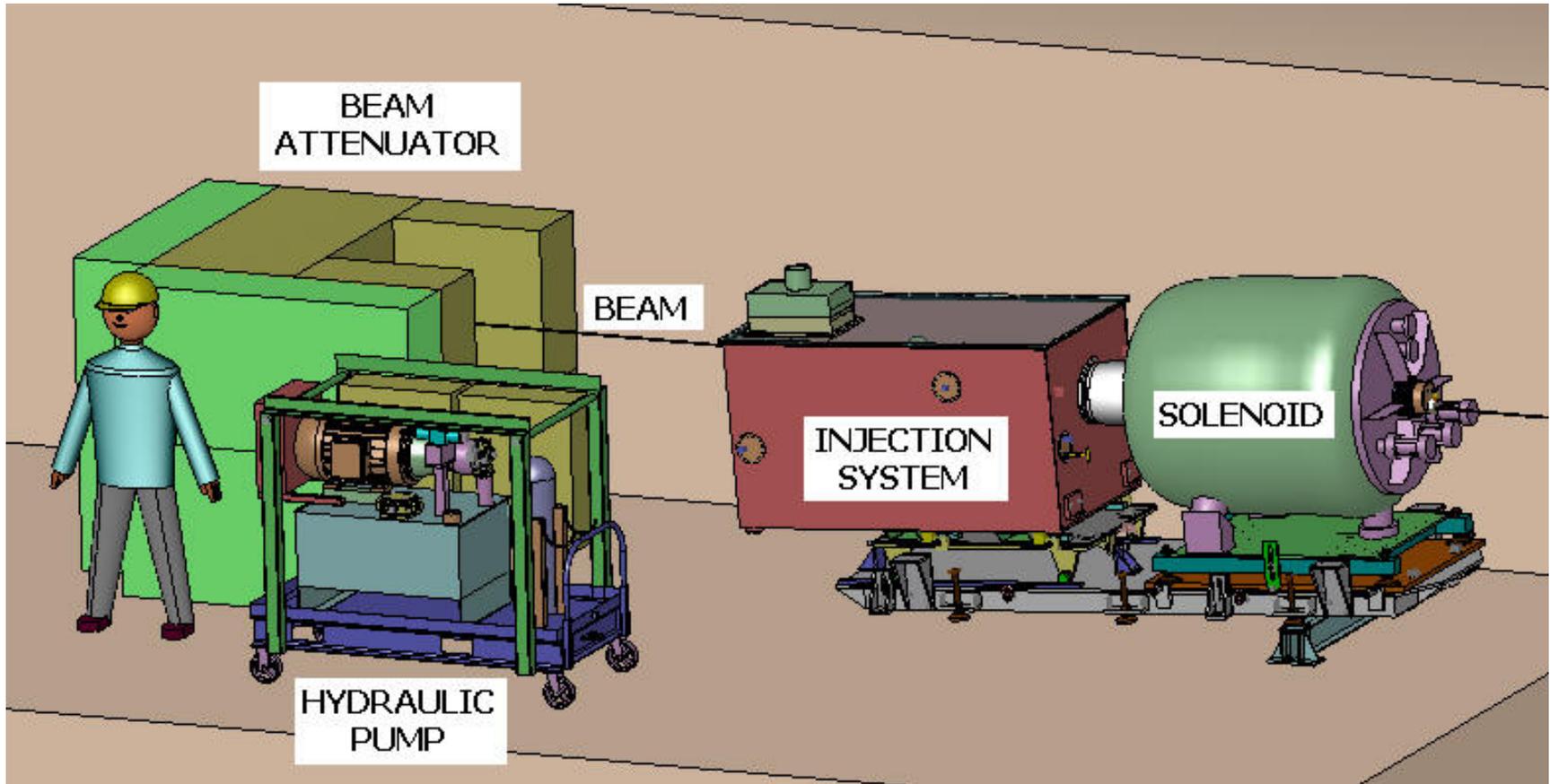
New Issues

- SMD (Ultrafast) Camera Failed
- Excess heating of the Pulsed Solenoid
  - Solenoid integrity
  - Optics

# Installing the Solenoid



# The MERIT (nTOF11) Experiment



**MER**cury **I**ntense **T**arget

# Installation in the CERN TT2a Line



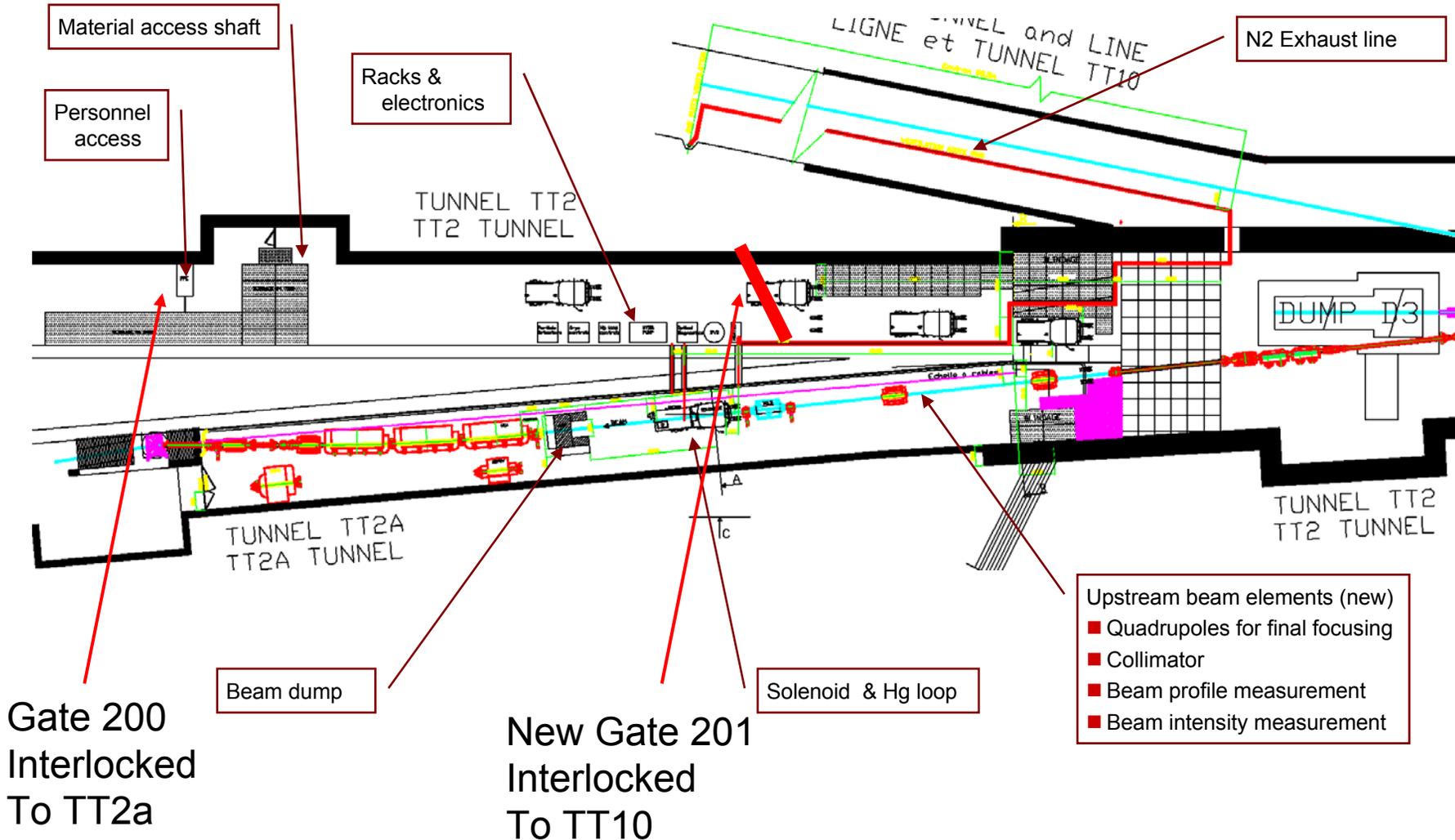
**Before Mating**



**After Mating and Tilting**



# MERIT Experiment Access

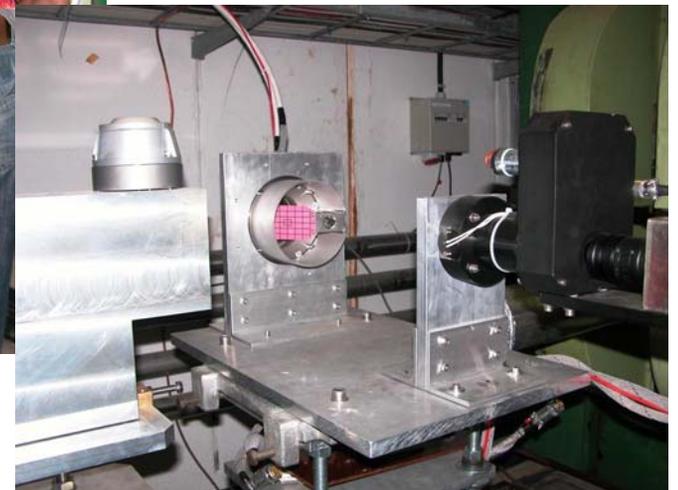


# Installing the D201 Barrier/Gate



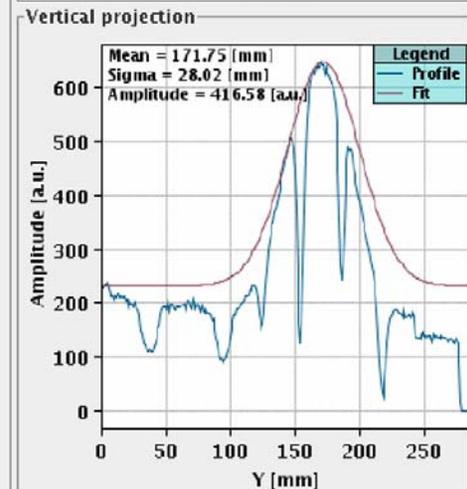
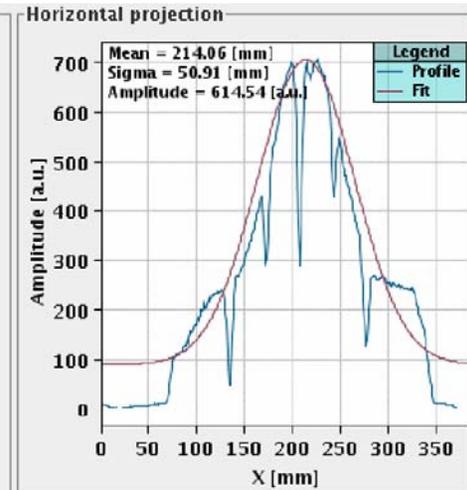
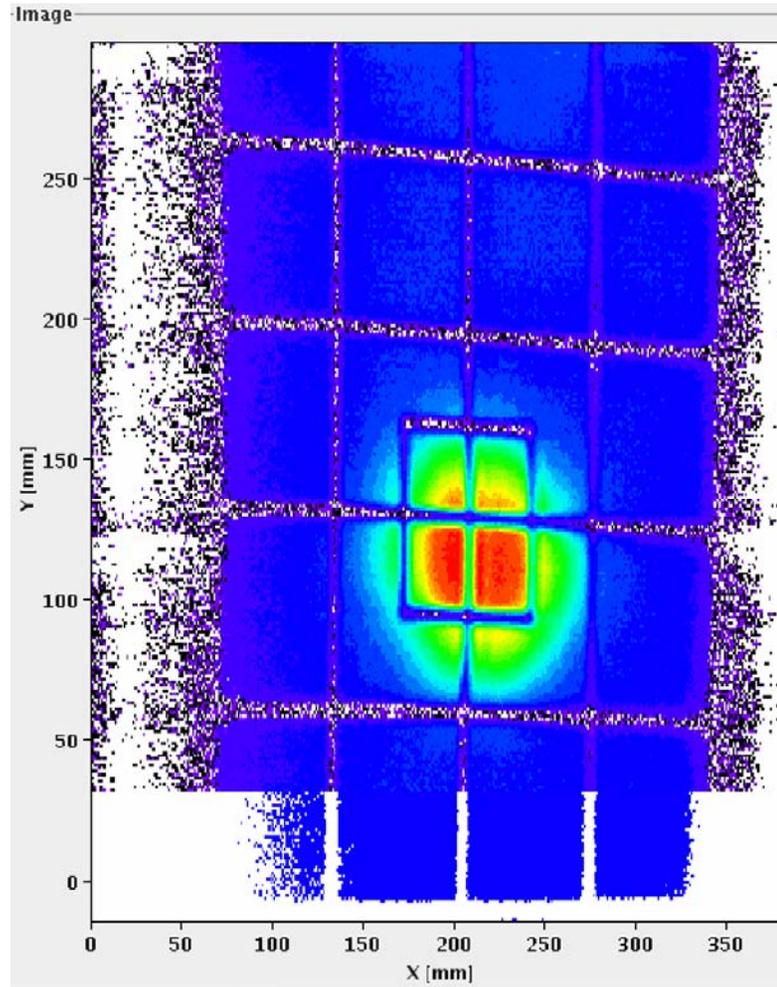
**August 28, 2007**

# Installing Beam Instrumentation



# First Beam August 24

14 GeV  
 $2 \cdot 10^{11}$  ppp  
 $\sigma_x$  (rms) 7mm  
 $\sigma_y$  (rms) 4mm



# MERIT Commisioning

Secondary Container  
For Hg Injector

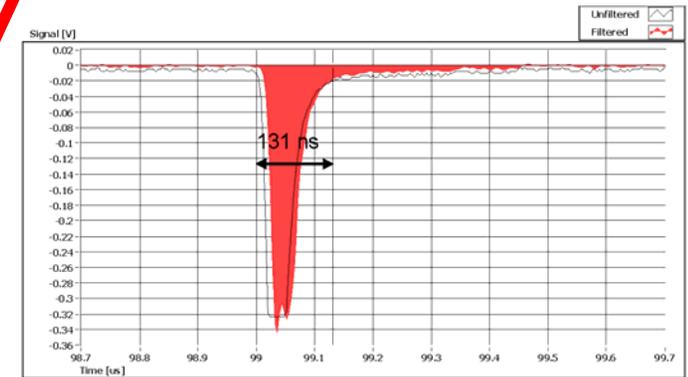
15T Pulsed Solenoid

Al Cathode and  
Diamond Detectors

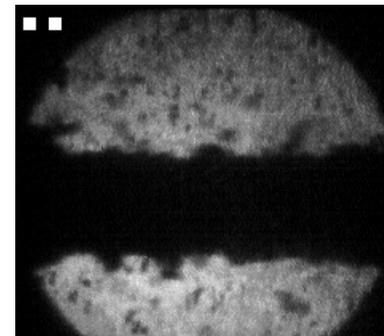


View of experiment looking upstream in TT2a

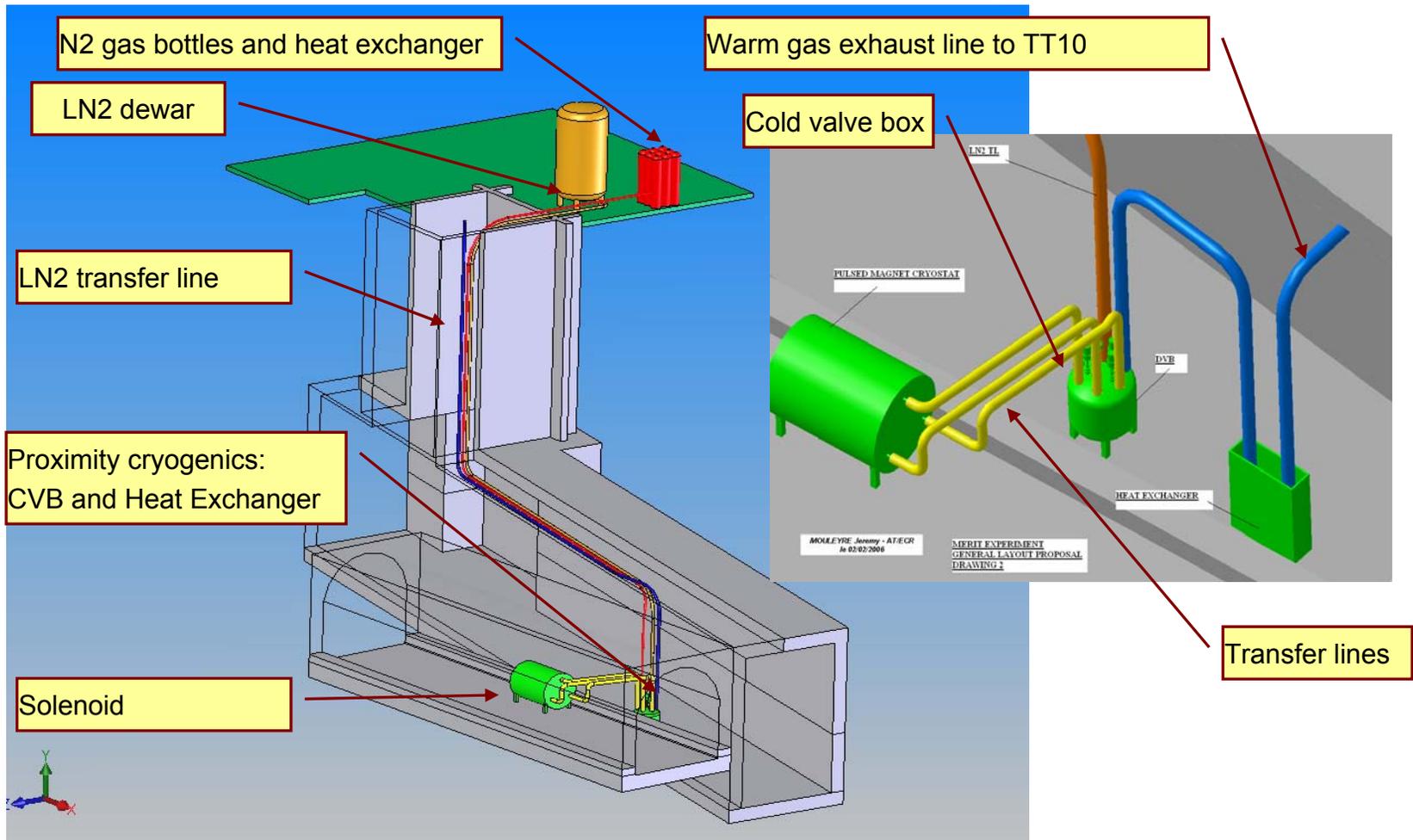
20m/s 1cm Hg Jet with 0T field Aug. 29



Diamond Wave Form Aug. 24  
 $2 \times 10^{11}$  protons at 14 GeV



# Cryogenics – Layout



# Cryo Installations



Transfer Lines to the Solenoid



Surface Cryo Components

# The Cryo DVB and Heater



# Excess Heating of the Solenoid

## Friday Sept. 8

- Low-intensity beam commissioning conducted
- At conclusion Main Control advises power supply group OK to place PS on standby status
- PS delivers constant 60A to cryostat

## Monday, Sept. 10

- Problem discovered- PS turned off
- Solenoid temperature peaks at 175<sup>0</sup> C

## Monday, Sept. 17

- Solenoid allowed to passively cool to 75<sup>0</sup> C

# The Coil Leads



Hipot Test

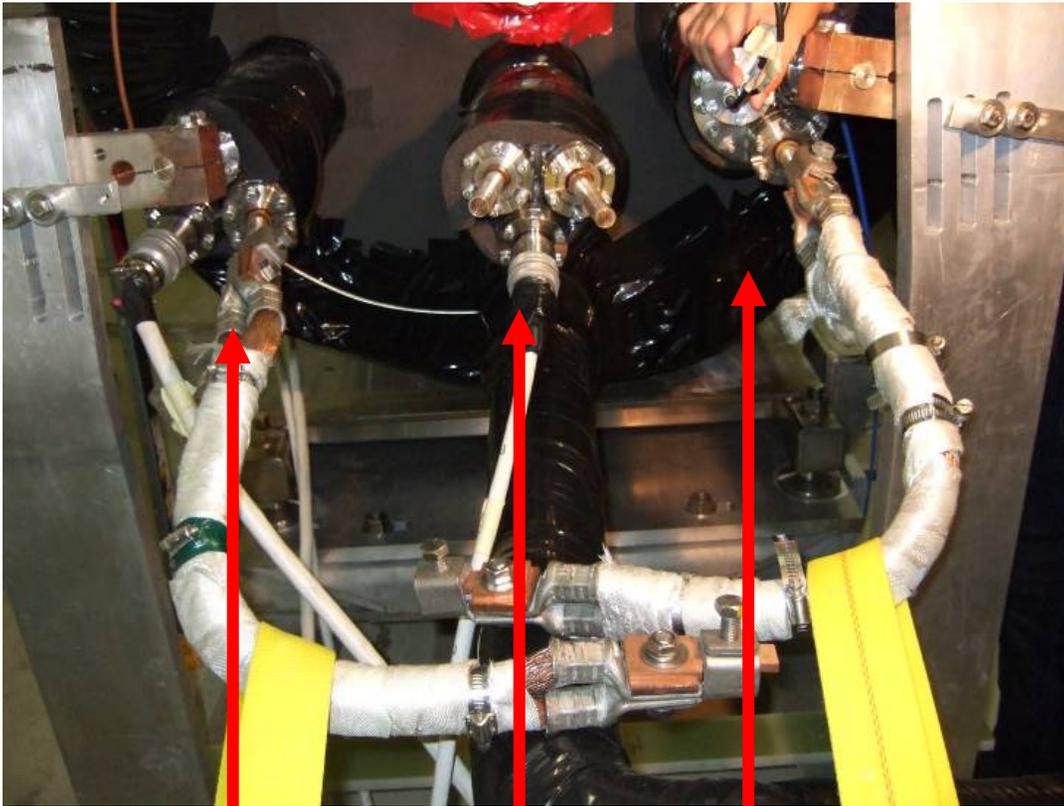
Outer  $8G\Omega$

Middle  $90G\Omega$

Inner  $50G\Omega$

May 31, 2007

# HiPot Test Sept. 19



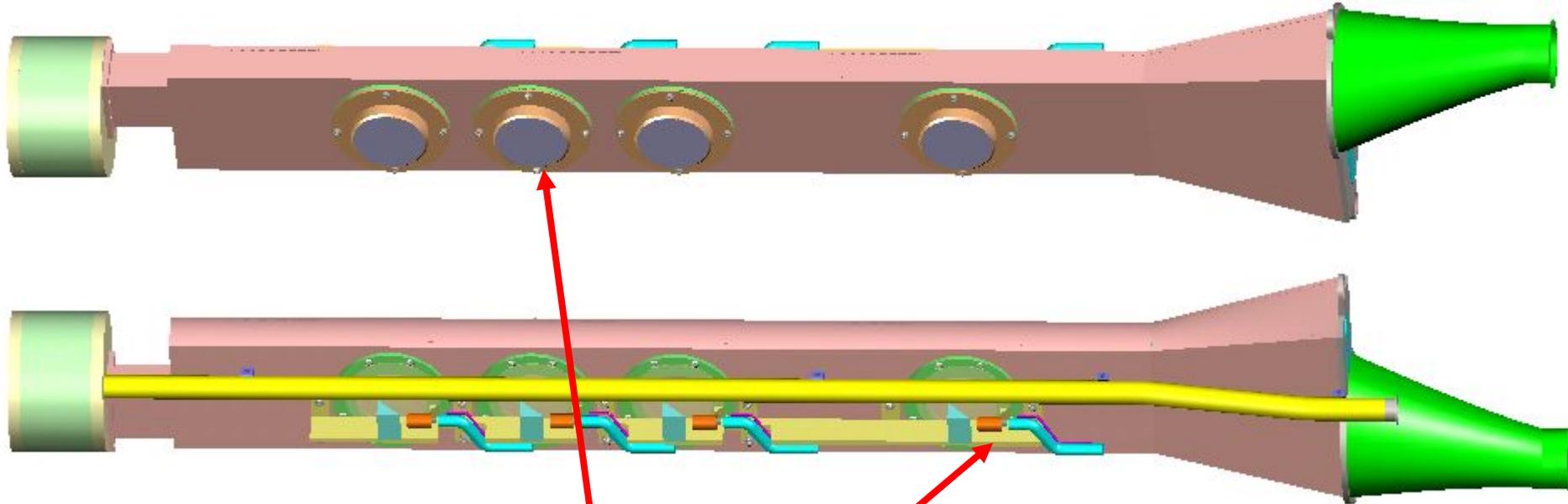
**Outer**

**Inner**

**Middle**

- Outer Coil  
**500 M $\Omega$**
- Inner Coil  
**600 M $\Omega$**
- Middle Coil  
**0.5 M $\Omega$**

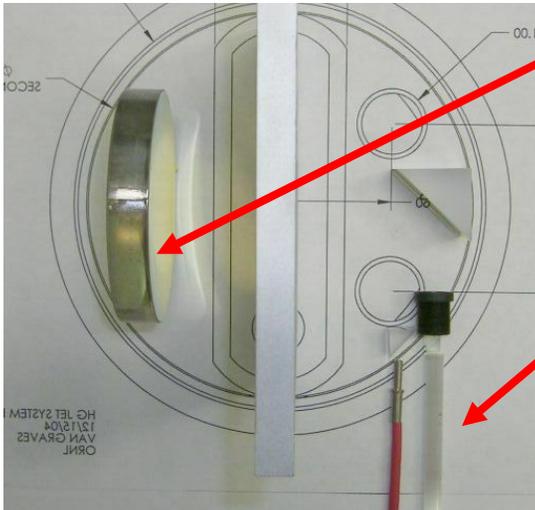
# Optical Diagnostics



Reflectors

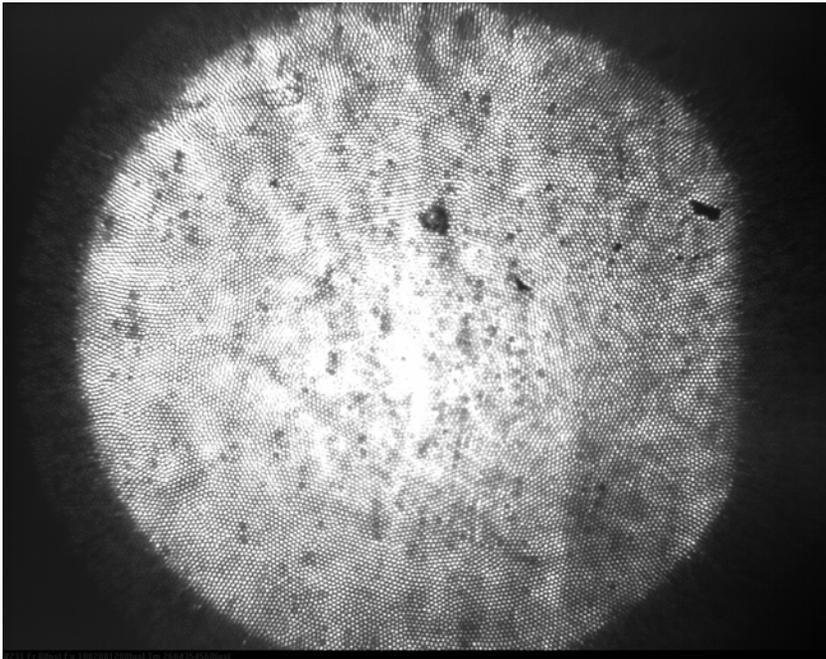
Illumination,  
Lens and  
Imaging

One set of optics per viewport

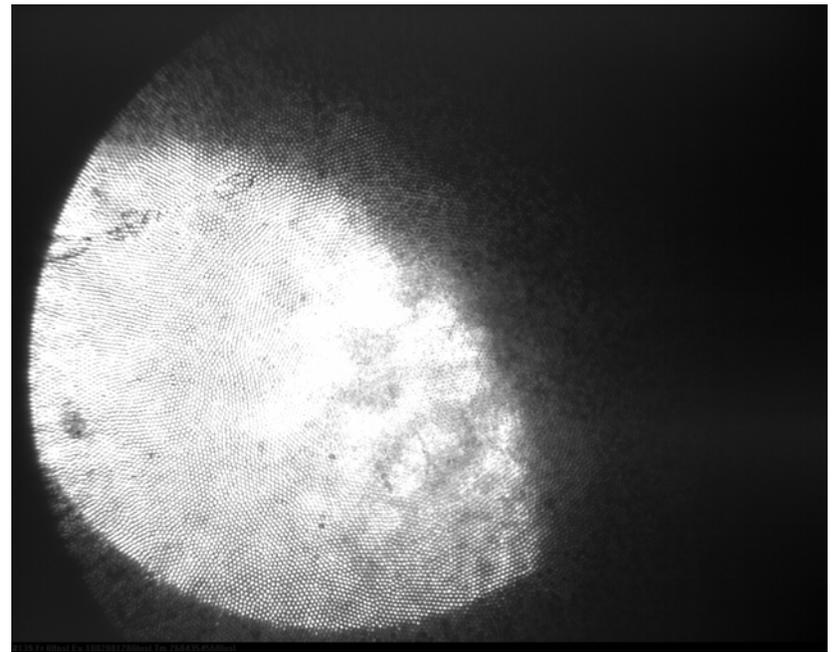


T.Tsang, BNL

**Viewport 1, Sep. 5, 2007**

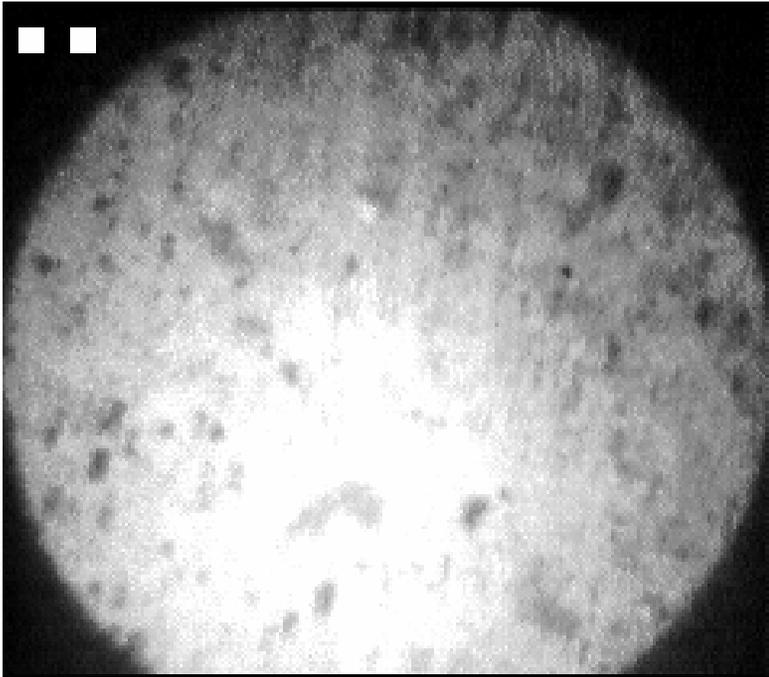


**Viewport 1, Sep. 19, 2007**

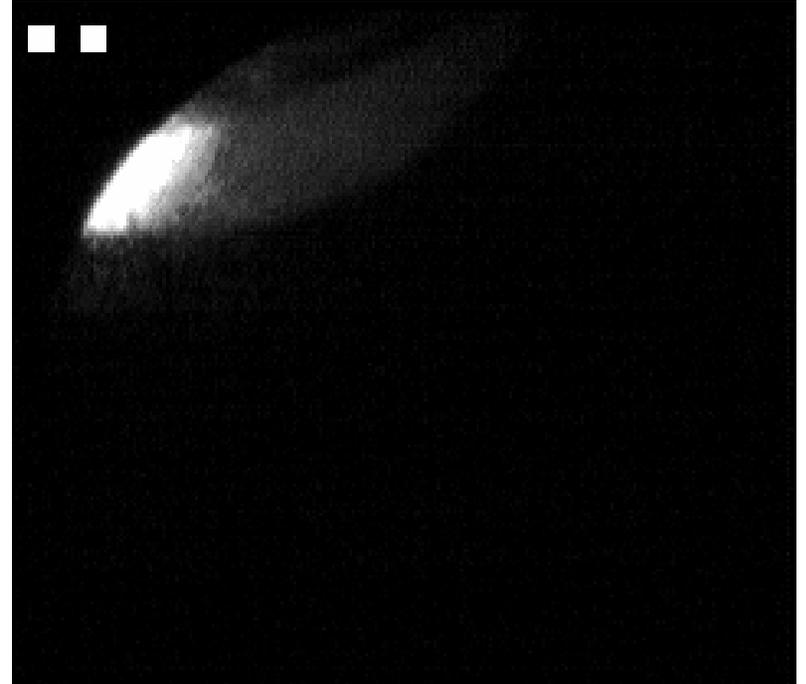


Temperature (°C) on HPU display  
Primary : 77  
Secondary : 30

**Viewport 2, Sep. 5, 2007**



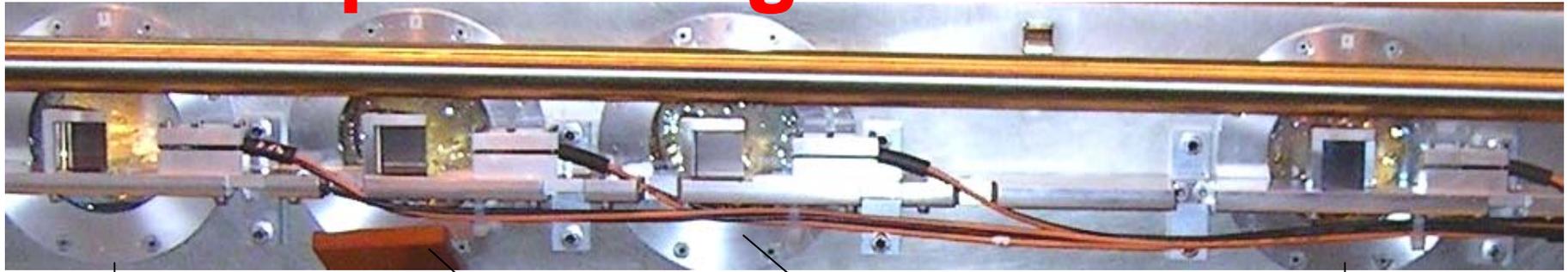
**Viewport 2, Sep. 19, 2007**



# Primary Optics Alignment



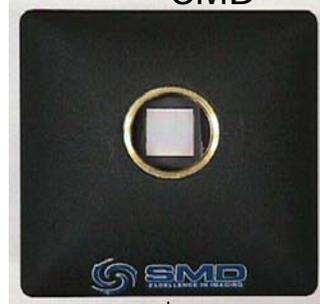
# The Optical Diagnostic Cameras



FastVision 1



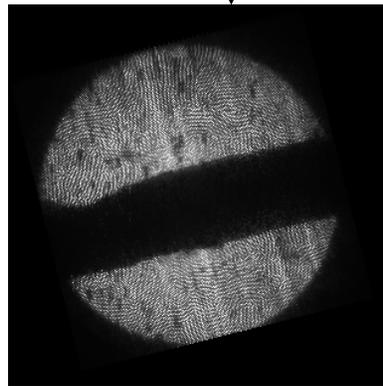
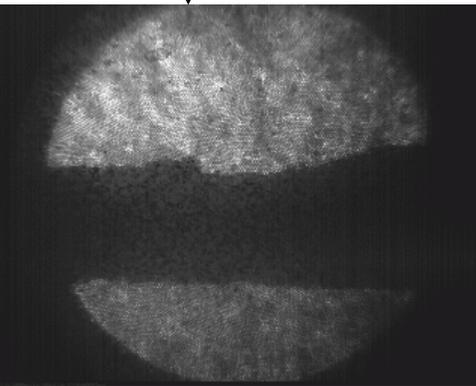
SMD



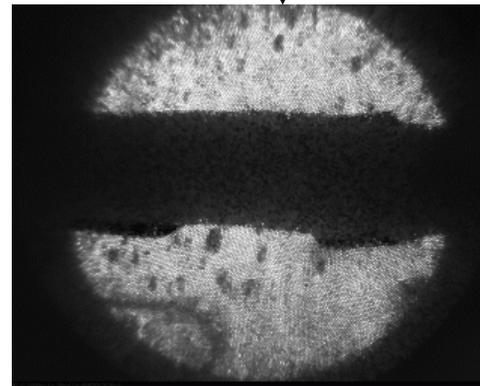
FastVision 2



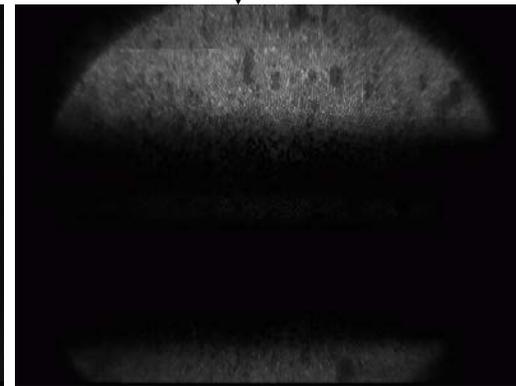
video camera



0.1 ms/frame

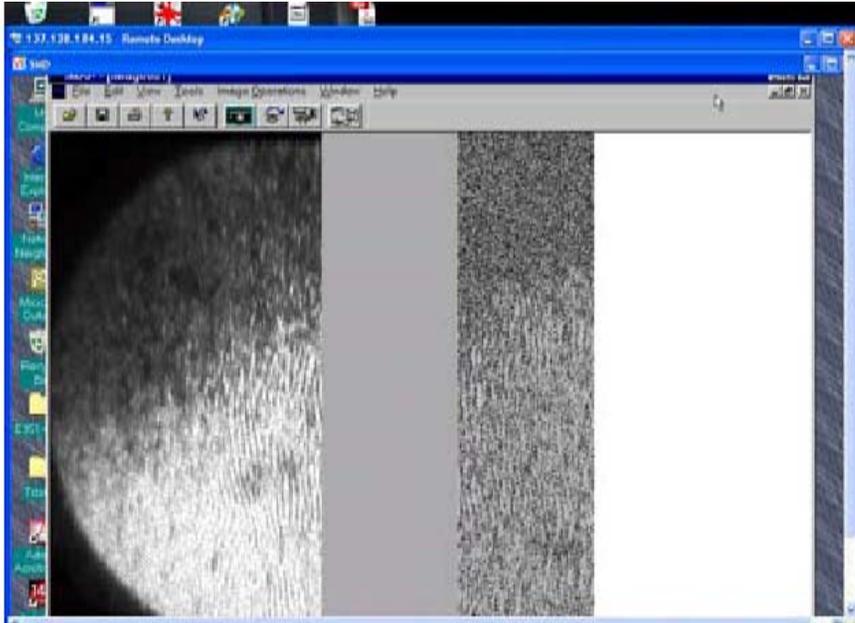


2 ms/frame

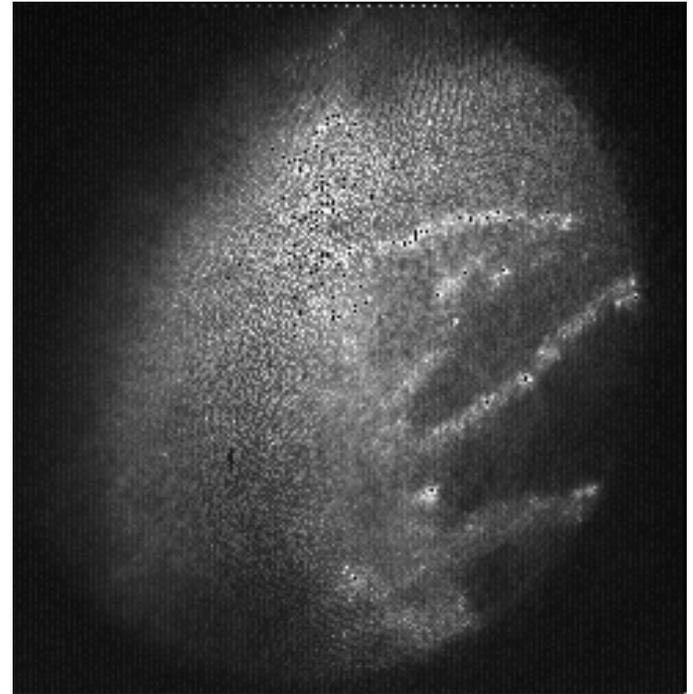


20 m/s Hg jet, 7 Tesla field

# The SMD Camera



**July 31**



**September 19**

Problem diagnosed as framegrabber failure. New framegrabber was secured and has been integrated into the diagnostics system.

# Status September 21

Solenoid is being actively cooled to RT. Further diagnostics will be done.

A TT2a access is requested to permit re-alignment of the primary optics.

The SMD camera will be returned to port 2.

Further commissioning of the proton beam is underway. Intense proton beam will be delivered.

MERIT physics run scheduled for Oct. 22-Nov. 12.