

# APEX 2007

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Instrumentation  
November 2, 2007*



SIXTY YEARS  
OF DISCOVERY  
1947-2007

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**BROOKHAVEN**  
NATIONAL LABORATORY



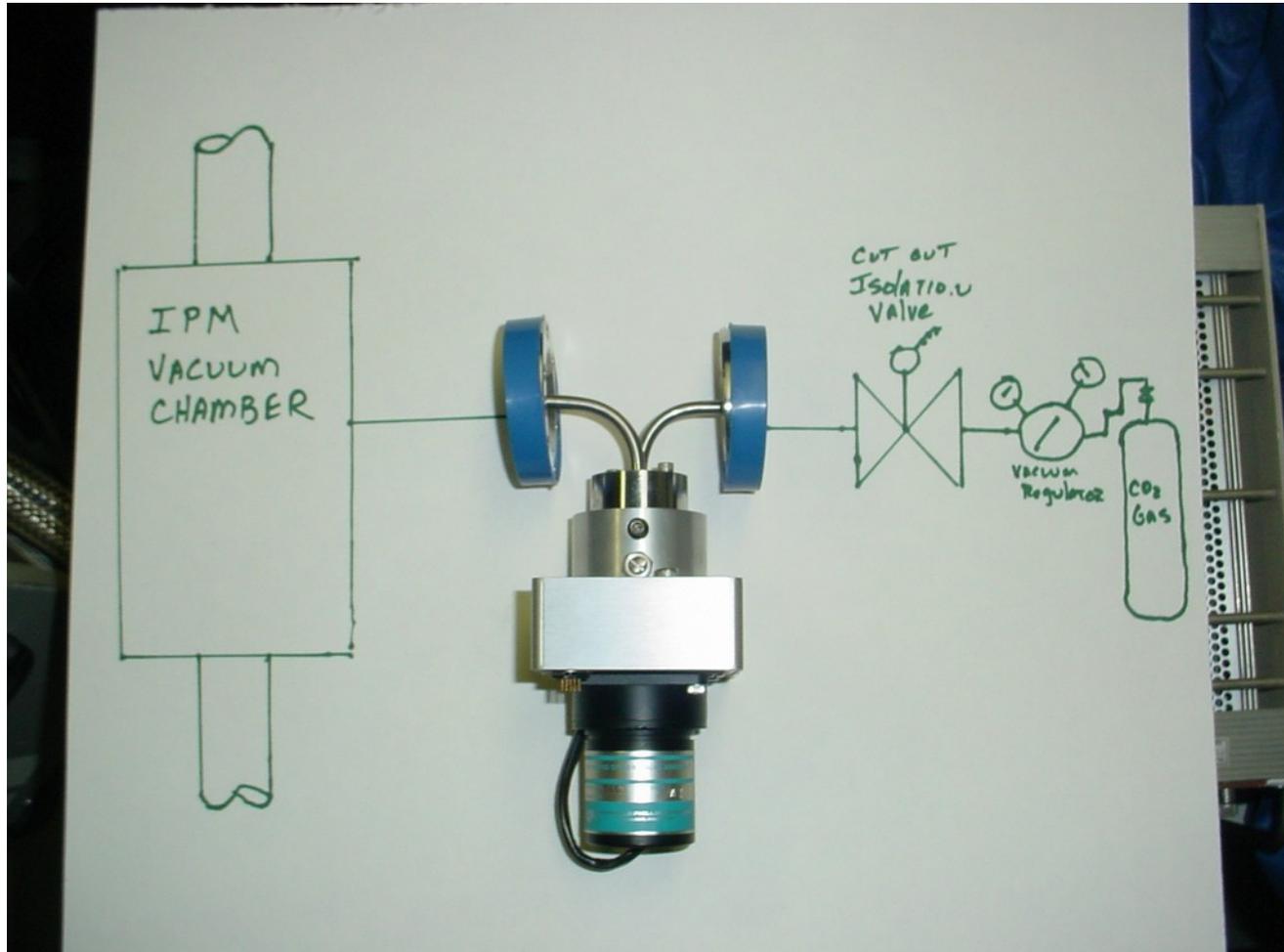
## Injector Instrumentation Booster/Transfer lines

- Loss monitors – there appears to be a communication problem in the crate. Controls is working on it.
- New camera for the flag at F6 still requires infrastructure. Plan is to have it operational before PP.
- Good news - Transfer lines plunging multi-wire bellows were replaced – units should now be functional
- Studies were performed in BTA for the transformer showing noise when the kickers fire – ceramic breaks were wrapped in foil – hopefully they'll be less noisy
- BPM's in BTA would be nice....But require recoding existing RHIC BPMs
- There is a move to develop a new tune meter for the booster – requires Rob/Michelle/Kevin....

## Injector Instrumentation AGS/ATR

- Jump targets – have been relocated - motion control hardware has been tested – applications may have to be written.....
- AGS IPM – we replace the gas servos now at the beginning of the run –and re-routed cables thru a quieter sleeve.
- Loss monitors should come on as they went off....we fixed gas leaks during the summer
- BPMs – we have holes and dead channels. Low level effort to get this system to (near) 100%. Obsolete – missing parts etc – outside estimates at \$10k - \$15k per chassis.....
- Other instruments ready to go
- New Michelle preamps at A3,I3 and G3
- ATR checkout is complete

# Injector Instrumentation



## RHIC Instrumentation BPM

- RHIC BPM system was rebuilt – again. This time we removed and replaced opto couplers.
- Gullotta et al have modified 542 out of 750 boards.
- Alcoves are 100% complete, all known bad boards from the end of last run replaced. We can repair approx 25 at a time.
- We still need to test timing code for the low energy run. Rob has written – Justin is looking at it now....
- Better control of the environment will reduce with temperature drift.
- There are building issues that are being ameliorated now..... There are blocked air ducts that will be moved, digital thermostats installed, windows covered.... There are some other code issues that have to be addressed....
- We are evaluating possible replacements to the system now... 2 year time scale for prototype.....

# RHIC BPM Boards



# RHIC Instrumentation BPM



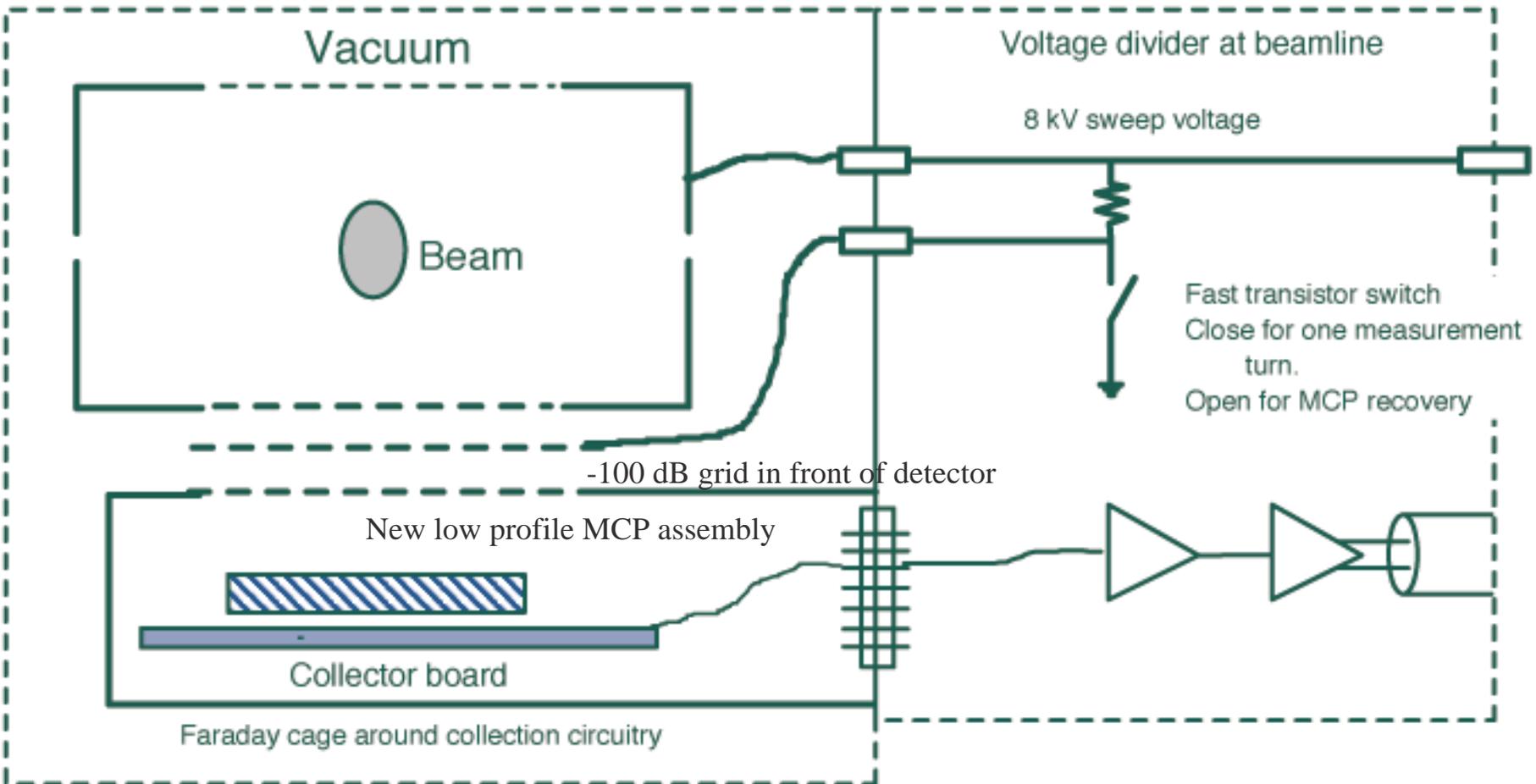
# RHIC Instrumentation BPM



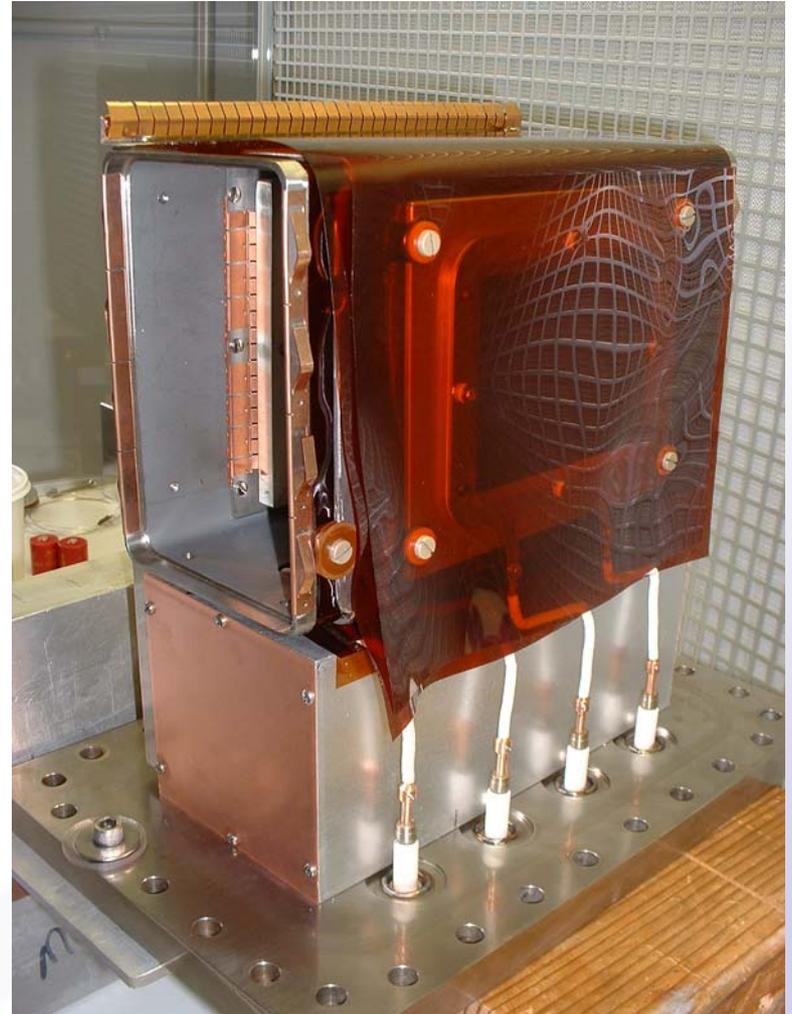
## RHIC Instrumentation IPM

- IPM - Engineering effort underway for improvement – starting inside the vacuum chamber. Yellow vertical is completely redesigned.
- Improved vacuum components – outgassing may have poisoned microchannel plates. No PEEK, nylon, Kapton. Ceramic HV insulators are used.
- Microchannel plate is completely enclosed. Improved RF shielding for signal cables, improved high voltage geometry. Only the plastic circuit board remains...
- IPM- Also, we are re-engineering the high voltage and pulsing circuitry. Component improvement and improved noise isolation...
- The MCP high voltage conditioning is complete on the new unit. The unit has been hi-potted and looks good.....
- Unfortunately, if there is a failure – we do not have vacuum isolation valves – we cannot put in a spare or make repairs easily...
- Need to look at complete new installations for next year at 6 and 10 o'clock....

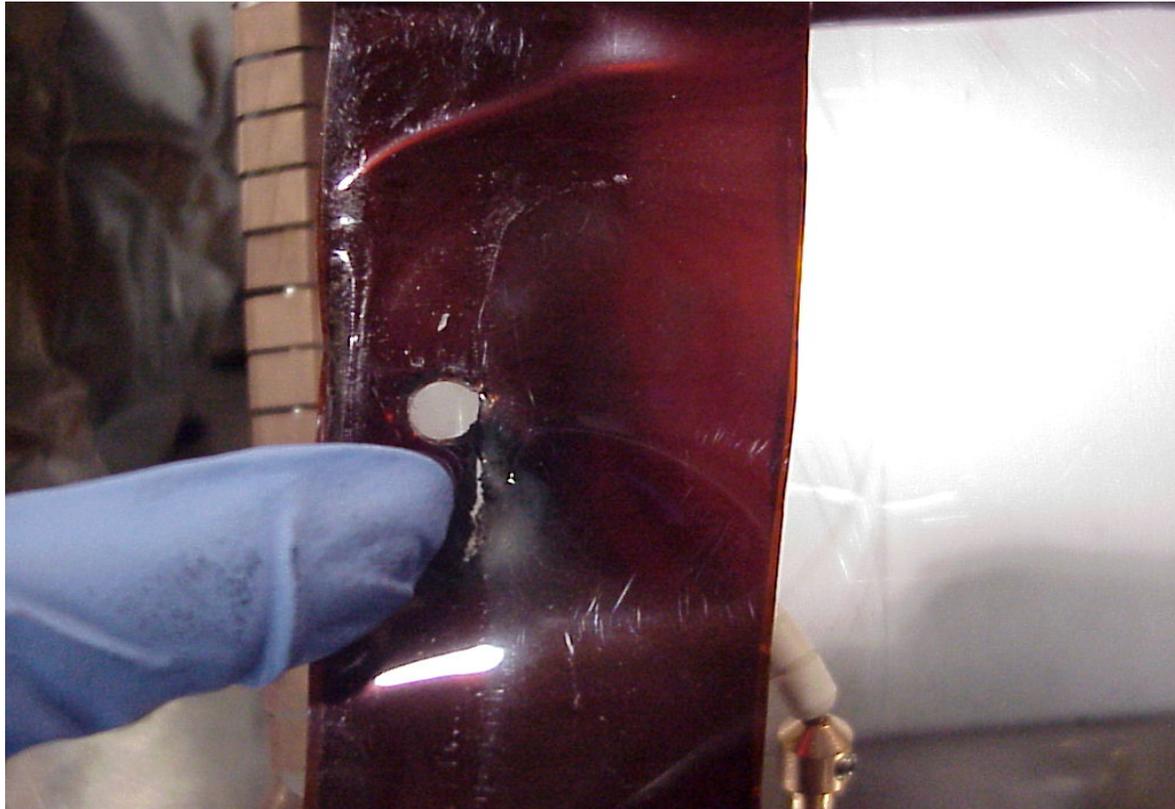
# Spare/prototype being built to reduce noise pickup



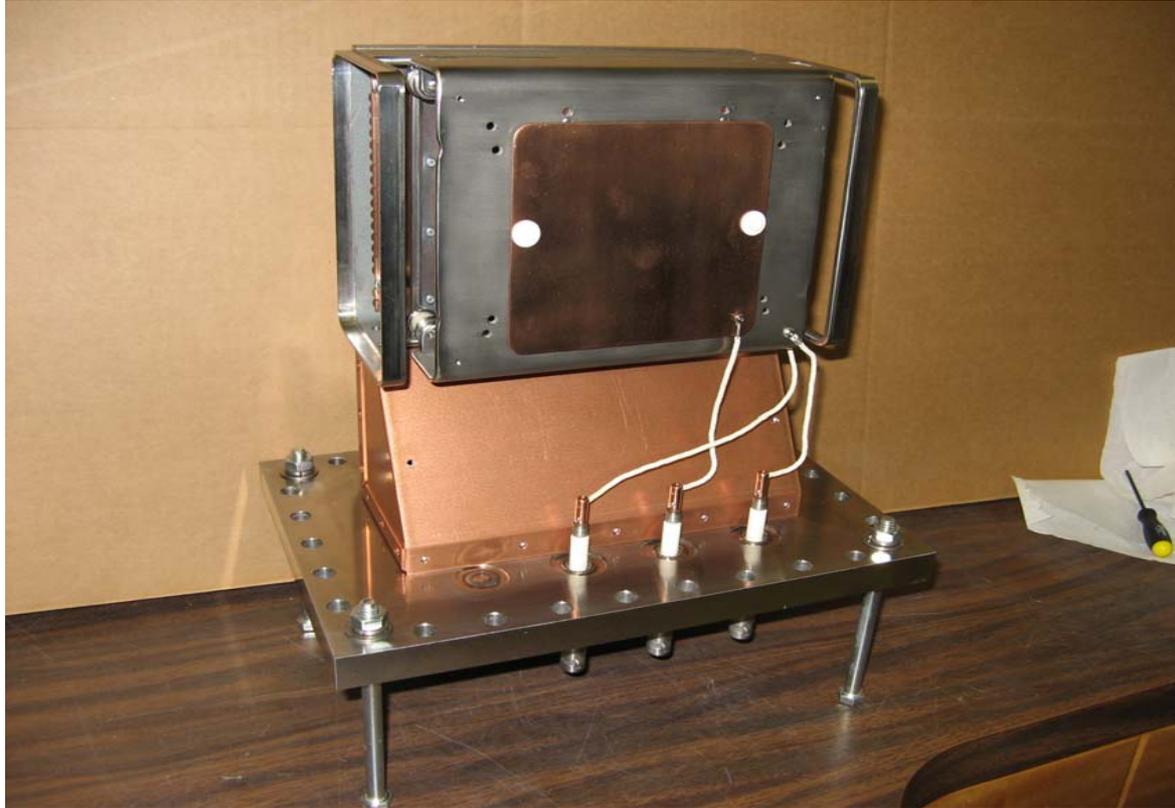
# RHIC IPM



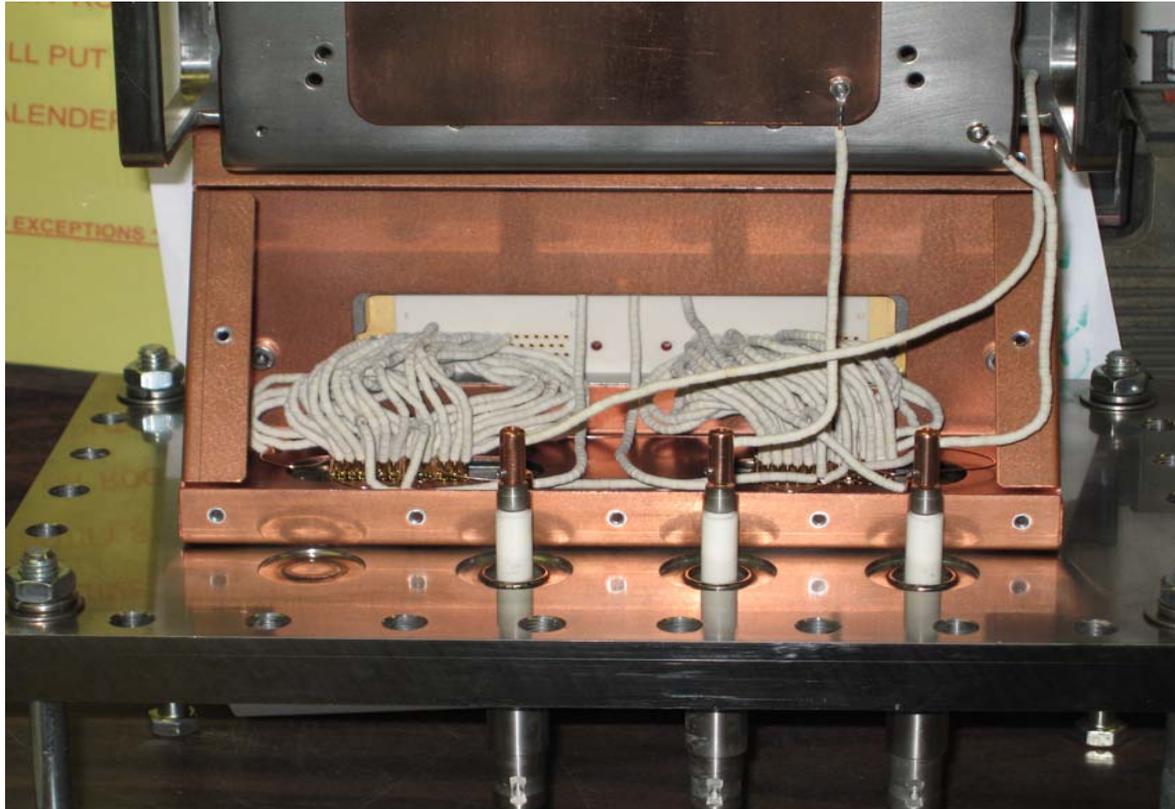
# RHIC IPM



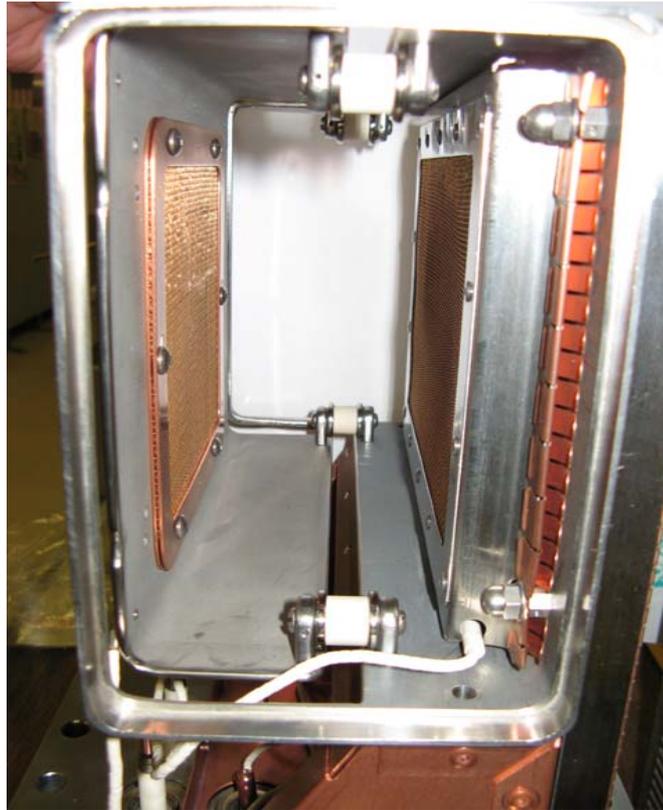
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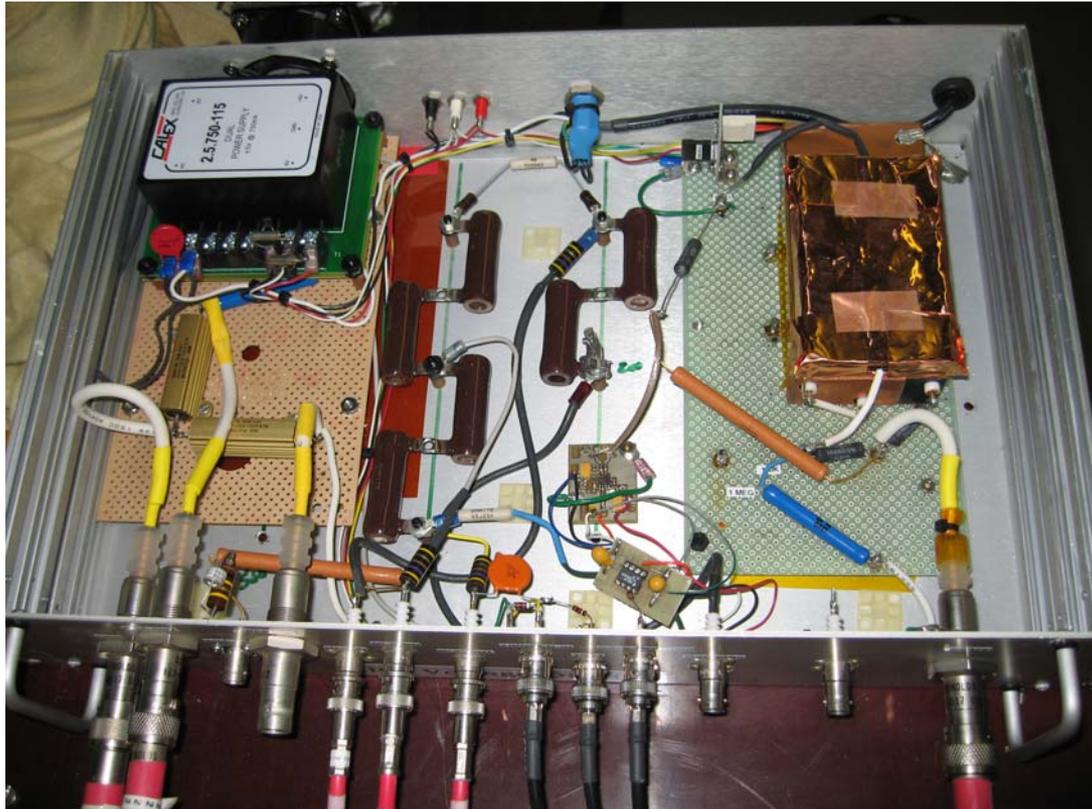
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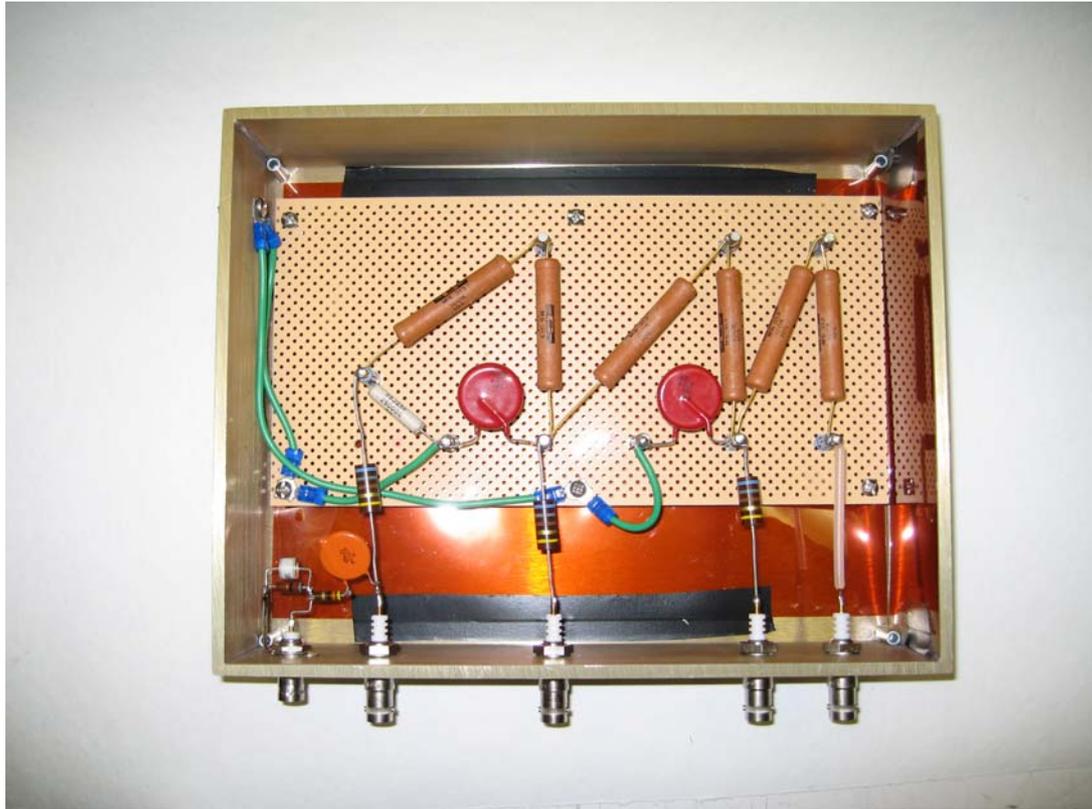
# RHIC IPM



# RHIC IPM



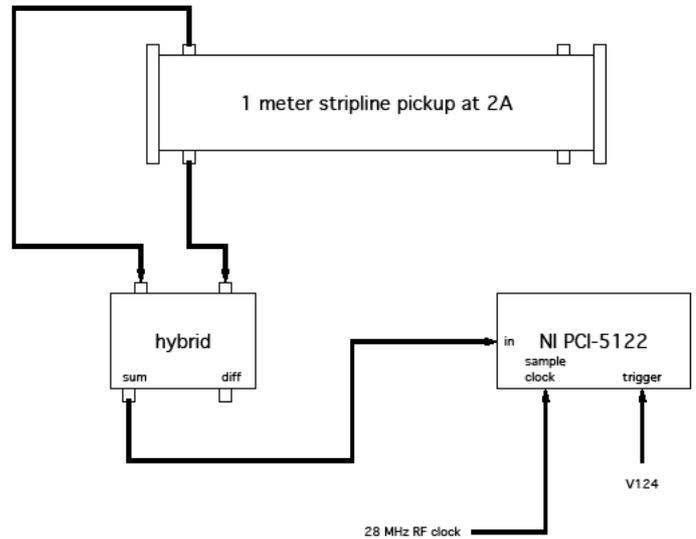
# RHIC IPM



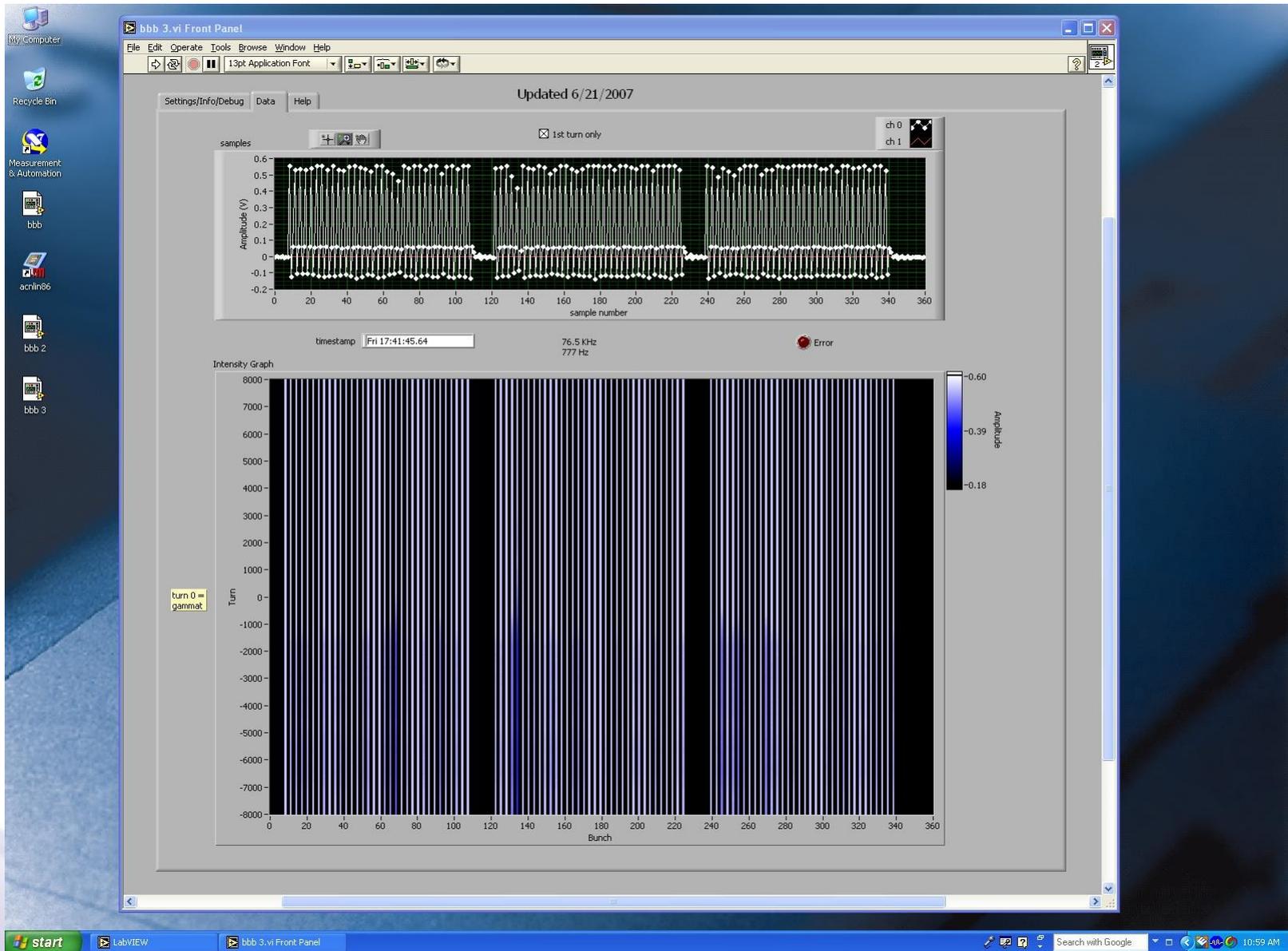
## RHIC Instrumentation MISC

- The bbbtbt monitor was tested the last day of the run with beam...this may work out as an instability monitor. A work in progress – still needs decimation in hardware and software. Digitization performed by a 2 channel 100 Mhz NI board – Degen/Dawson

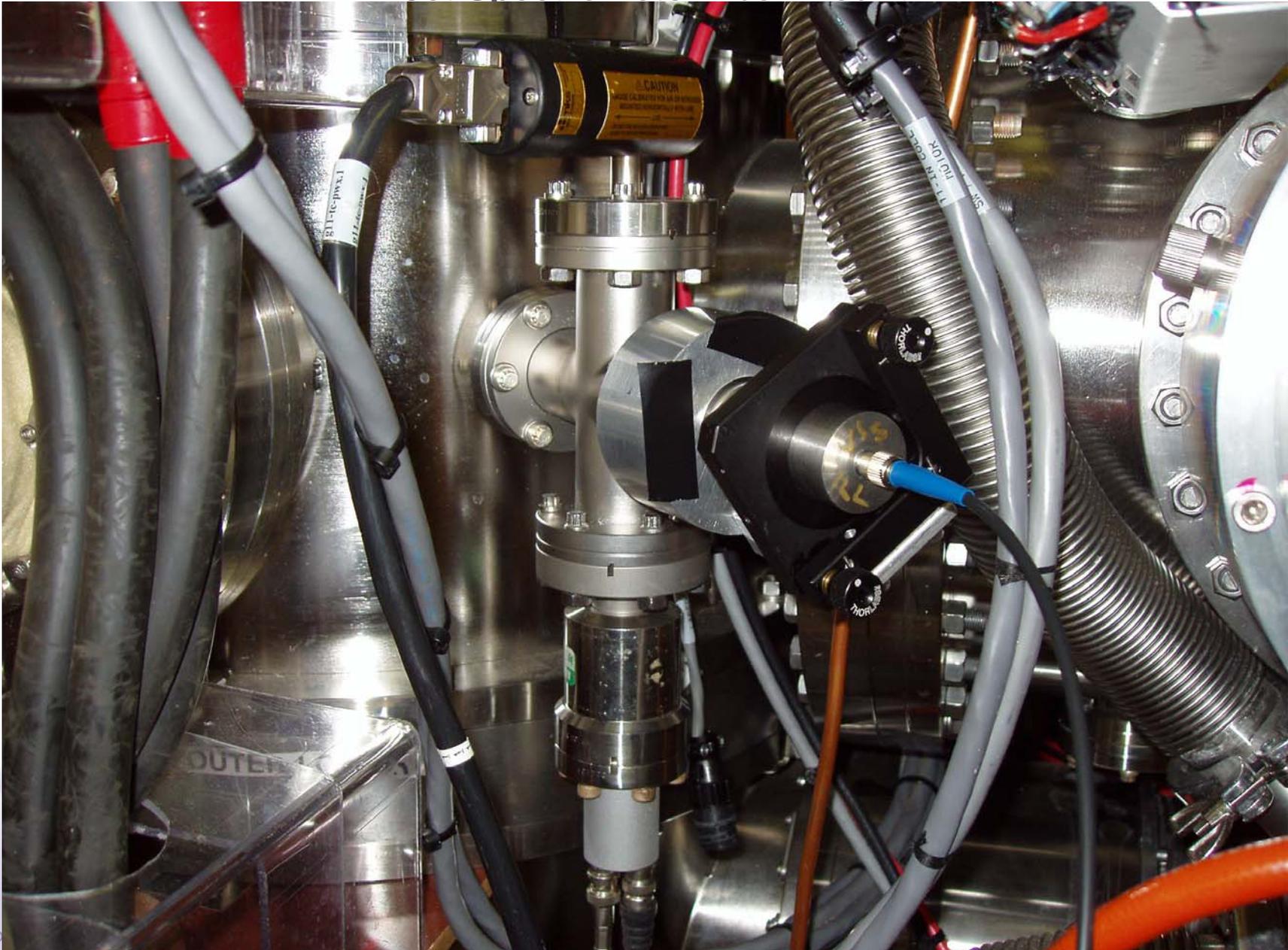
# RHIC Instrumentation bbbtbt monitor block diagram



# RHIC Instrumentation bbbtbt monitor



# RHIC Instrumentation Jet Spectrometer fiber mount



# RHIC Instrumentation Lambertson Motion



## RHIC Instrumentation MISC

- Jet camera may need to be replaced, change filters, and maybe a lens for transmission of the molecular hydrogen spectra.
- Other devices are being turned on for the run such as ED's Pin diodes – no issues reported – yet.....
- Work in progress for the tune meter/damper Russo/Dawson....