PHENIX

TECHNICAL SUPPORT 2011

PHENIX WEEKLY PLANNING

9/15/2011

Don Lynch

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This Week

- MuTr station 2 & 3 N & S capacitor clamps and termination Done
- Begin installing terminators and reworking dry air manifolds in station 2 N on station 1 side in progress
- Fabricate parts for Station 2 N access from station 1 side in progress
- VTX repairs/upgrades/reassembly continues
- FVTX assembly continues
- RPC1 assembly & QA testing continues at factory
- Continue cable fabrication, electrical support and assembly for RPC1
- Continue gas system tasks
- Reconfigure scaffolding for RPC1 North installation Done
- RPC1 North Installation continues (5 octants in, remaining 3 by Friday)
- West IR 1 ton crane load test Done

Next Week

- Continue installing terminators and reworking dry air manifolds in station 2 N on station 1 side
- VTX repairs/upgrades/reassembly continues
- FVTX assembly continues
- RPC1 assembly & QA testing continues at factory
- Continue cable fabrication, electrical support and assembly for RPC1
- Continue gas system tasks
- Reconfigure scaffolding for RPC1 North installation
- Install west CM hanging work platform
- RPC1N and RPC1S racks plumbed and wired ready for installation
- RPC1 North Installation continues – Cables and cable trays

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General Tasks 2011 Shutdown

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• Remaining Work Permits needed	
• End of Shutdown WP	10/1
• IR Crane repairs and upgrade (east done, west later)	Done
• Reinstall BBC North	10/7
• Reinstall BBC South	11/18
• Upgrade AH crane	10/15-11/30
• DC/PC1 East/West troubleshooting as required	10/15-11/15
• Undefined detector subsystem maintenance and repairs	7/25-11/7
• Prep for EC roll in, reinstall MMS lampshade	11/28-12/2
• Roll in EC	12/5
• Prep IR for run	12/5-12/9
• VTX, FVTX and RPC1 Services and QA tests (including 4 new racks)	9/16-11/30
• Pink/Blue/White sheets	12/12-12/23
New and upgraded full detector commissioning	9/15-12/31
• Run 12 cooldown	1/1/2012

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VTX/FVTX Tasks

• FVTX Interconnect cables all available	testing in progress
• VTX LDTB spares available	Done
• Spiro boards removed ready to ship for repair	Done
• Replace Capacitors on all LDTB boards	Done
• Test ladders with LDTB's	Done
• 6 FVTX ROCs available	9/12 ?
• Test Strip-pixel readout Chain	Done
• FVTX, 1st 1/2 cage available. 1/2 cage system test in	9/16
• JPS Meeting	9/16-20
• FVTX 1/2 cage install in VTX @ Chem lab. 1/2 cage + VTX ladder test start	9/19
• Hirose connector fix	8/9-9/23
• VTX spare pixel ladder at BNL. Ladder install starts. Physics lab	9/23
• FVTX Remaining ROC boards at BNL	9/30
• Re-test ladders after pixel barrels re-installed	10/5
• FVTX all 1/2 cages ready	10/21
• VTX+FVTX final installation to start	10/21
• Final VTX+FVTX Survey in Chem Lab	10/24-10/28
• VTX+FVTX ready to move to 1008	10/31
• VTX/FVTX Installation at 1008	
• Build 2 FVTX racks	7/1-9/15
• Install VTX/FTX, Re-connect VTX services, Install FVTX services, survey and QA tests	10/24-11/11
• VTX/FVTX Commissioning & Contingency	11/11-12/31
• Chiller leak/contamination improvements	10/1

StriPixel Status

- Repair of LDTBs complete
- Testing of barrels complete
  - All ladders working up to specifications
- Testing and debugging CIB/DIBs in progress
  - Miljko is at BNL this week
  - Work is focused on FEM crate
  - East barrels are needed for the testing
- No additional work is anticipated
- Will need 3-4 days after barrels are reassembled for final testing

Pixel Status

- West barrels have been disassembled for cleaning next week.
- East barrel will be disassembled when StriPixel work is complete (early next week?)
- New ladder is being encapsulated
  - Broken wire bonds have delayed this several days
  - Ship date pushed back to 26-Sept
- SPIRO boards still need work
  - Not all pins on samtec connector re-flowed properly
  - Few boards not functioning
  - Working with Chuck and BEST to resolve the problems (no estimate at present)

Pixel Status

- Extender pre-forming
  - Walt and Hubert are investigating at LANL
- Schedule:
  - Clean West/East Side starting 9/21-9/23
  - Reassemble and test west side 9/26-10/5
  - Install and test new ladder 9/29-10/4
  - Reassemble and test east side 10/5-10/11
  - Detailed schedule can be found at: https://www.phenix.bnl.gov/WWW/p/draft/mannel/WWW/electronics/VTX_Pixel_Work.xls

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MuTr North Station 1 work

• Station 2 Maintenance/upgrade through access opened by station 1 removal (3 weeks concurrent with next task)	9/2/-9/23
• Clean/install new parts and upgrades (MuTr (3 weeks, At RPC Factory)	Done
• Re-install chambers and FEE plates (1 week)	9/26-9/30
• Re-cable, re-hose and test (3 weeks)	10/3-10/21

MuTr North & South Station 2 & 3 Re-cap clamps

(No internal work platforms to upper octants)

• Install new capacitor clamps and terminators in lower octants	(In Progress) 7/25-12/31
• Re-install MMS east vertical lampshade	11/15

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RPC Tasks

Procurement and Assembly at RPC Factory	In Progress
Build 1 new rack, upgrade existing RPC1 prototype rack	7/25-9/23
Install north RPC1 (including north rack & services) (3 weeks)	9/6-9/23
HV Tests, gas system calibration	9/23-10/14
Move Station 1 work platforms to south station 1	10/17-10/28
Install south RPC1 (including south rack) (3 weeks)	10/31-11/11
RPC1 north and south commissioning	
RPC3 HV Distribution modifications, gas distribution modifications, PS calibration HV and services testing	9/6-11/30

Electronics Group Tasks

2011 Shutdown

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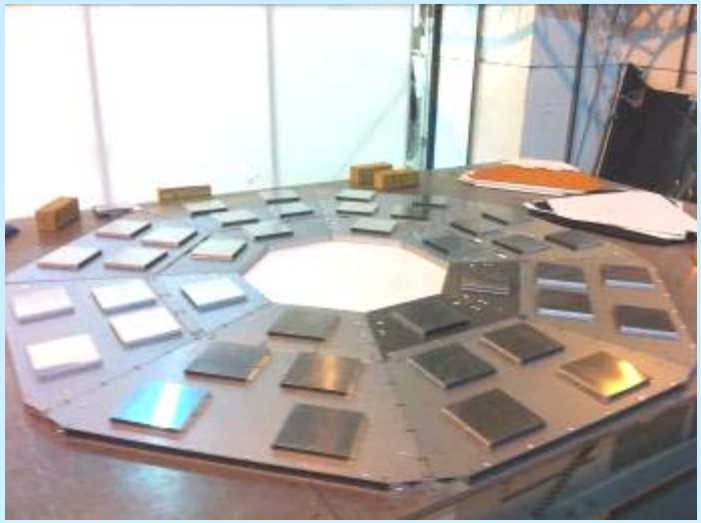
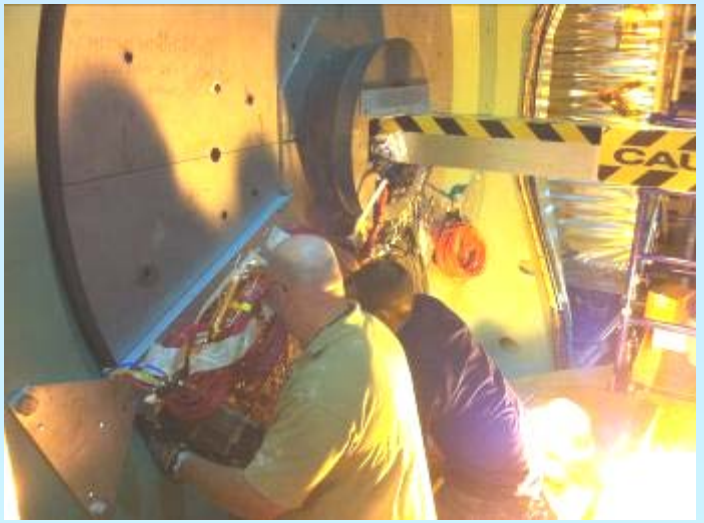
- RPC1
  - HV Cables
  - Signal cables
  - LV cables
  - Racks
    - Parts
    - Bring RPC prototype rack down for rework
    - Plumbing
    - Wiring
    - Install on bridge
- RPC3 additional HV boxes — **Ass'y in progress**
- FVTX
  - Bias cables
  - signal cables
  - LV cables
  - Fiber
  - Mapper boards
  - CMT3 and CMT4 FVTX racks
    - Design
    - Procurement
    - Plumbing
    - Wiring
    - Install on bridge
- VTX
- PbSc teminator board production
- MuTr station 1 capacitors
- West carriage ADAM system performance upgrade
- Complete the GL1 6X1 Multiplexer assemblies and test
- LeCroy HV control retrofit testing — ***Still Waiting for documentation from Debrecen Institute***
- Design/Install FVTX Interlock system. — ***Design Done ready for installation***

Miscellaneous Gas & Cooling System Tasks

- Redo bypass line on VTX/FVTX spare chiller to remove kink 7/1-12/31
- Move RPC R134A tanks nearer to GMH, install cover, insulated lines 7/1-12/31
- Replace MuTr flowmeters (north and south) 7/1-12/31
- RPC ¼" copper line from RPC rack to CM 7/1-12/31
- Relocate RPC3 South gas rack from tunnel mezzanine to tunnel floor 7/1-12/31

TECHNICAL SUPPORT 2011





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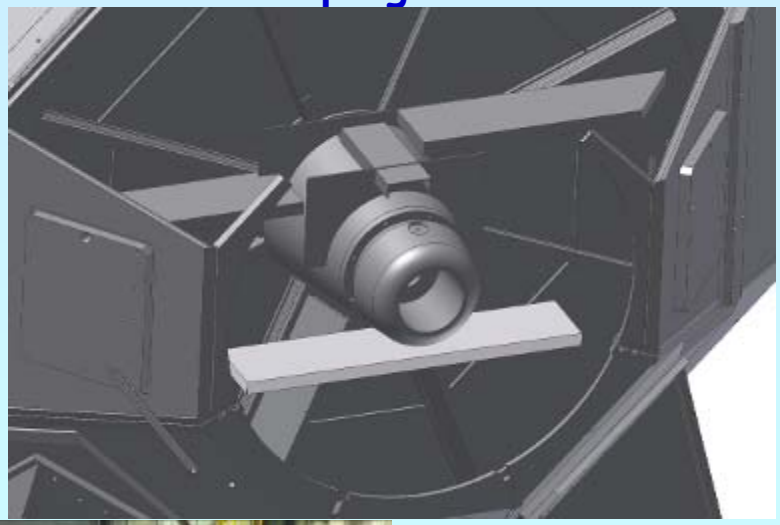
Station 2 access from station 1 side (MMS shown above MMN at left is similar in concept)

Design of access platforms is in progress



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RPC Factory site utilized by MuTr station 1 chamber repair/upgrade

DONE

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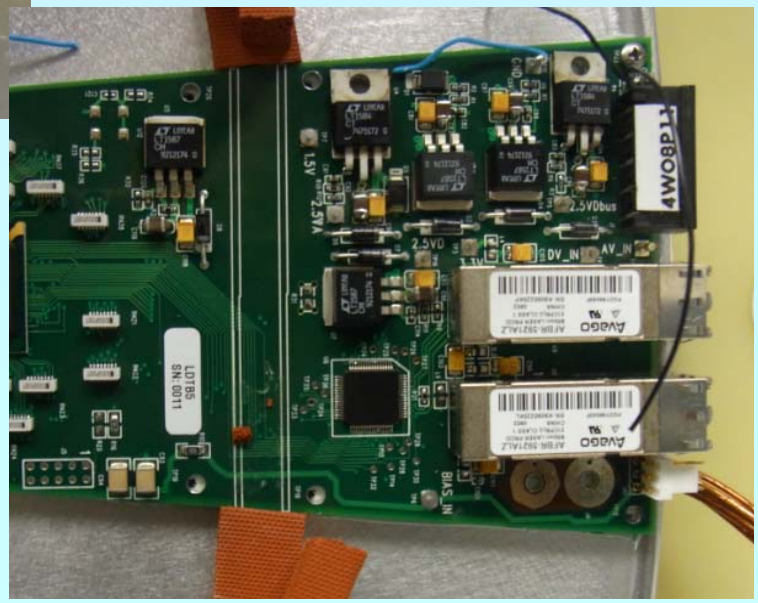

VTX

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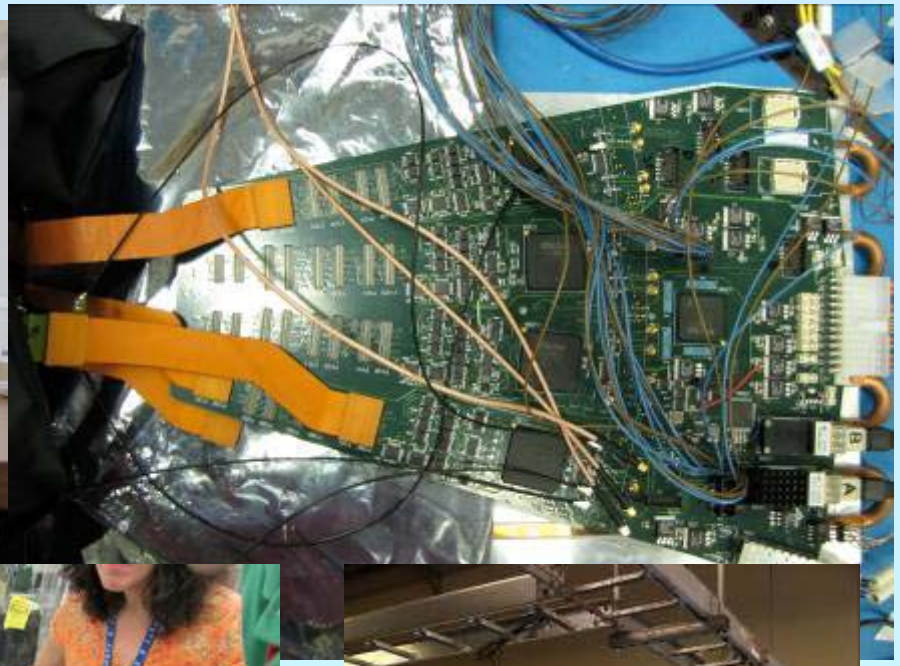
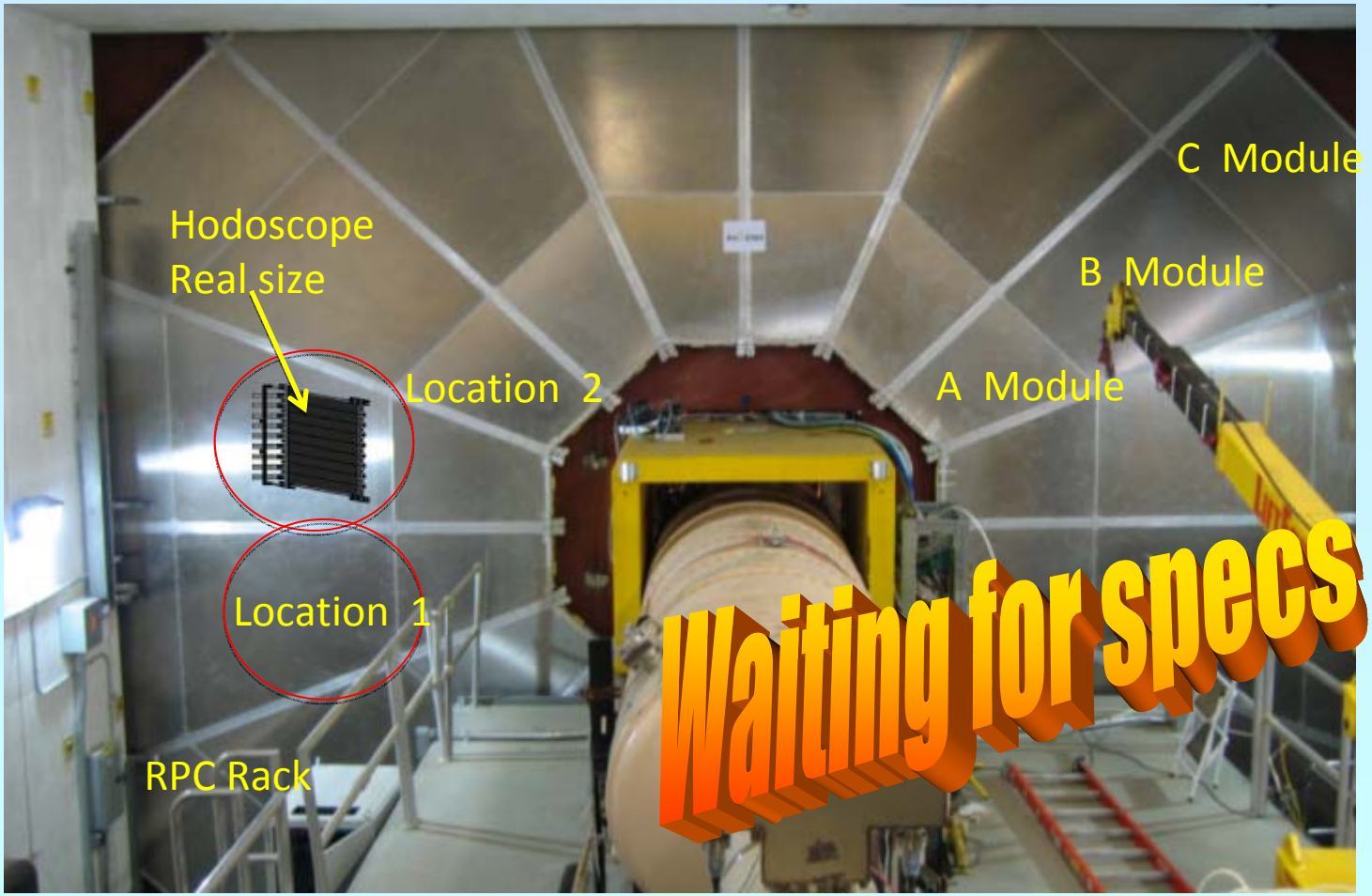


FVTX

RPC Hodoscope



Close to RPC3 electronics rack
Less Beam background region

Location 1 or 2 would be good position

Hodoscope for RPC3 (update)

IhnJea Choi

UIUC

PHENIX Planning Meeting 09/15/2011

ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Issues with the RPC3 efficiency, ε, measurement

Need to know accurate RPC3 efficiency

- For measuring cross sections using RPC3 timing information
- For RPC3 hardware performance (RPC eff depends on gas mixture, Pressure inside chamber, HV, other environmental variables)

RPC3 Efficiency from Cosmic Ray with MuID Trigger

- Trigger timing window of MuID is more than one BCLK wide

-RPC has one beam clock timing window

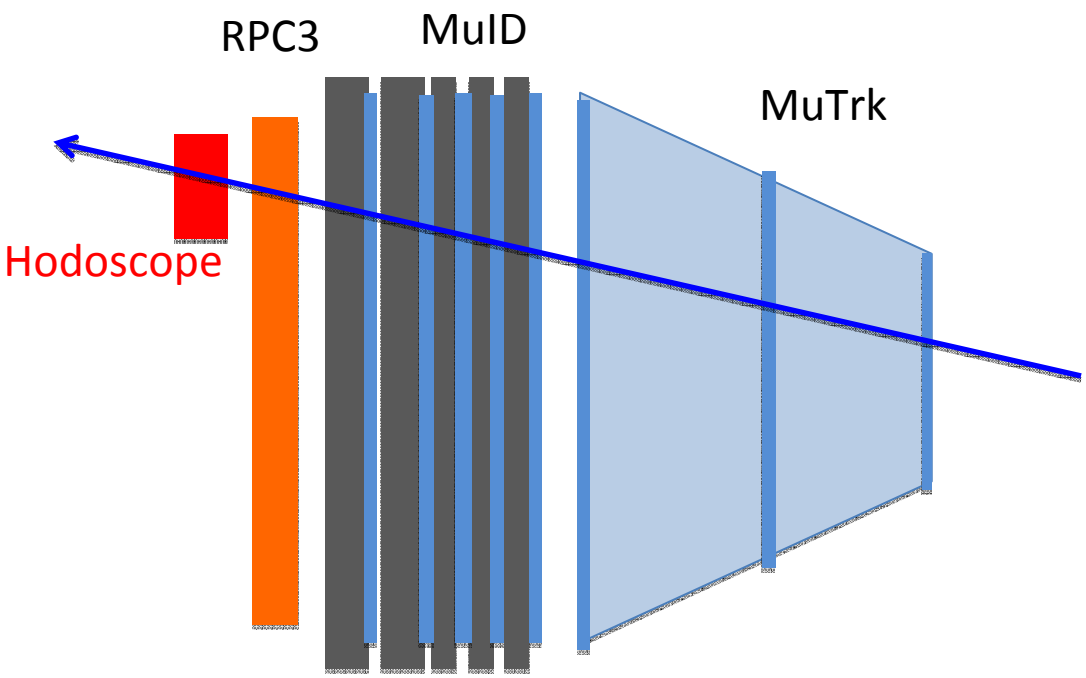
- So, some MuID events have no RPC hit in cosmic ray data

RPC3 Efficiency from reconstructed muon track

-Due to MuID last wall between RPC3 and MuID, some particles could be absorbed in the wall (Lower efficiency)

Need a Hodoscope behind the RP3 for accurate RPC3 efficiency measurement

Hodoscope

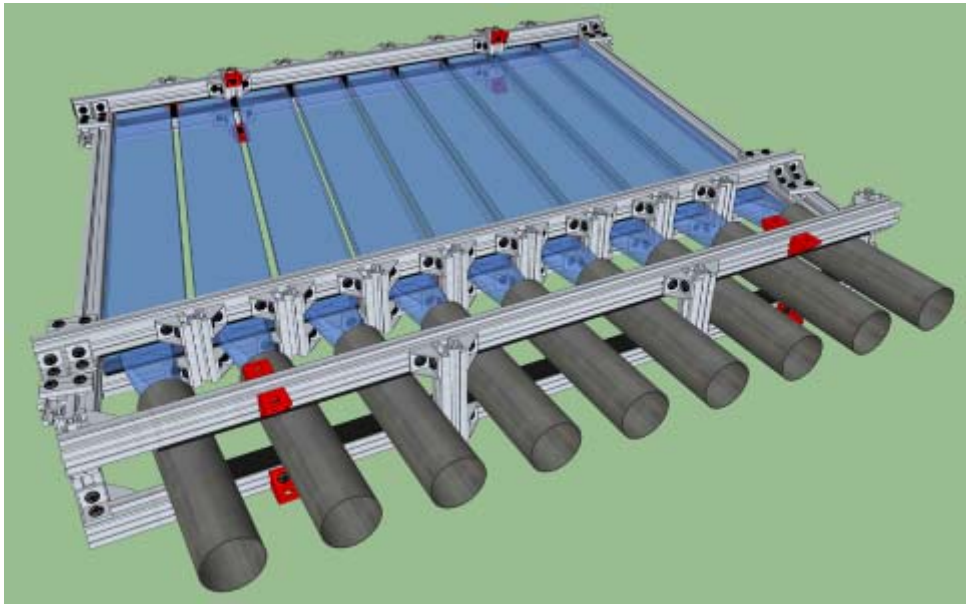


RPC3 Efficiency with Hodsoscope =
# of RPC3 hits / # of Muon Tracks Projected on RPC3 & **Hodoscope hit**

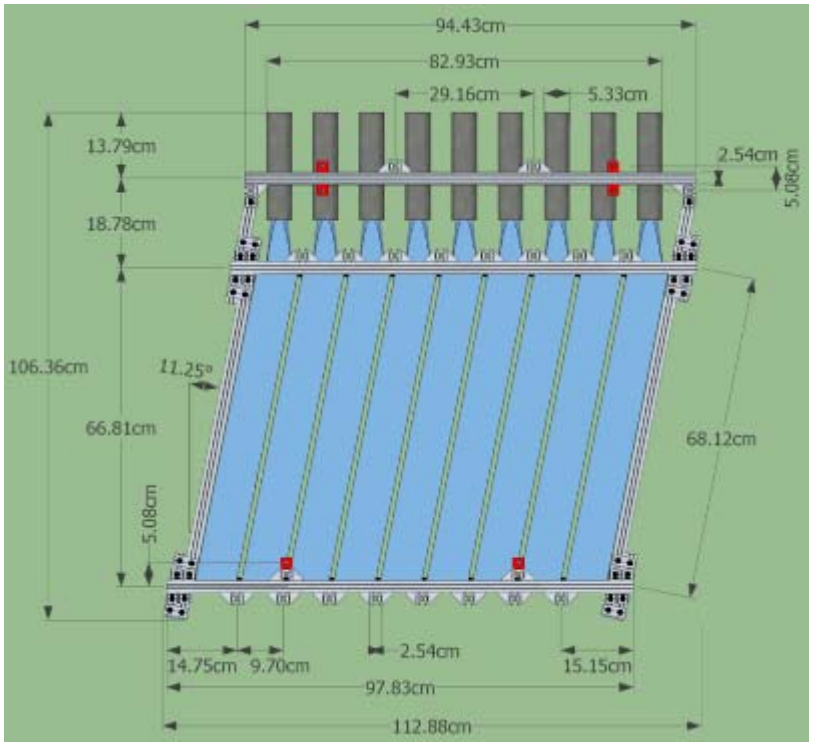
Extract absolute RPC3 efficiencies (Run by Run Absolute efficiency possible)

Hodoscope Design

Design by Daniel Jumper (UIUC)



Hodoscope 3D View

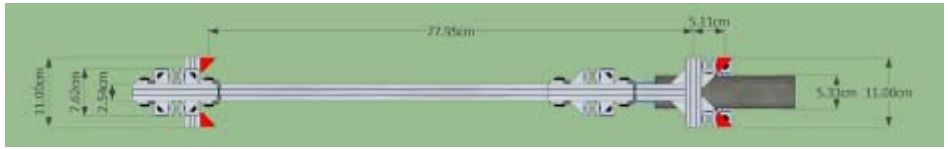


Front View

9 Scintillators + 9 PMTs

Size : 96 x 107 x 11 cm

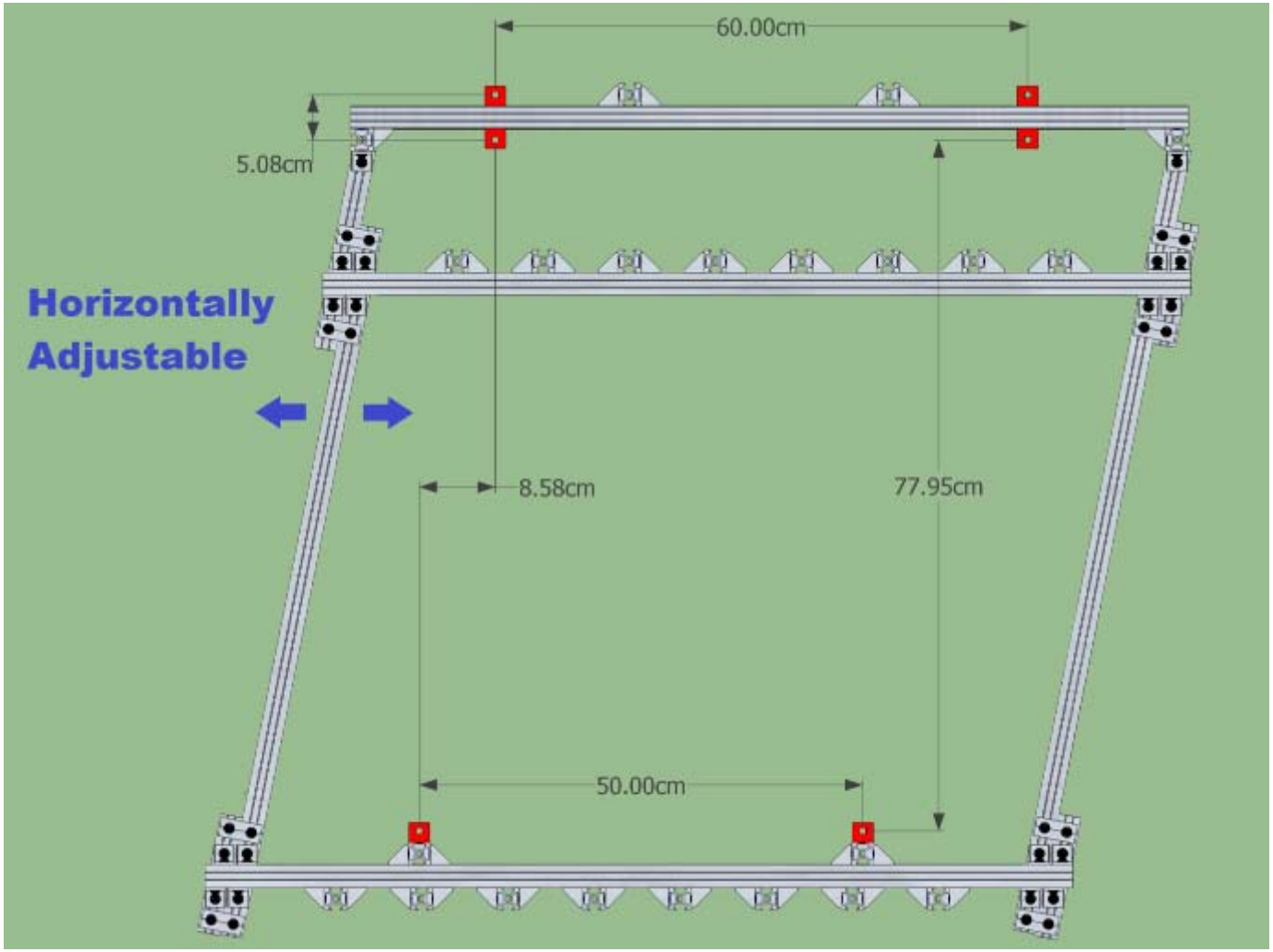
Weight : ~ 73 lb



Side View

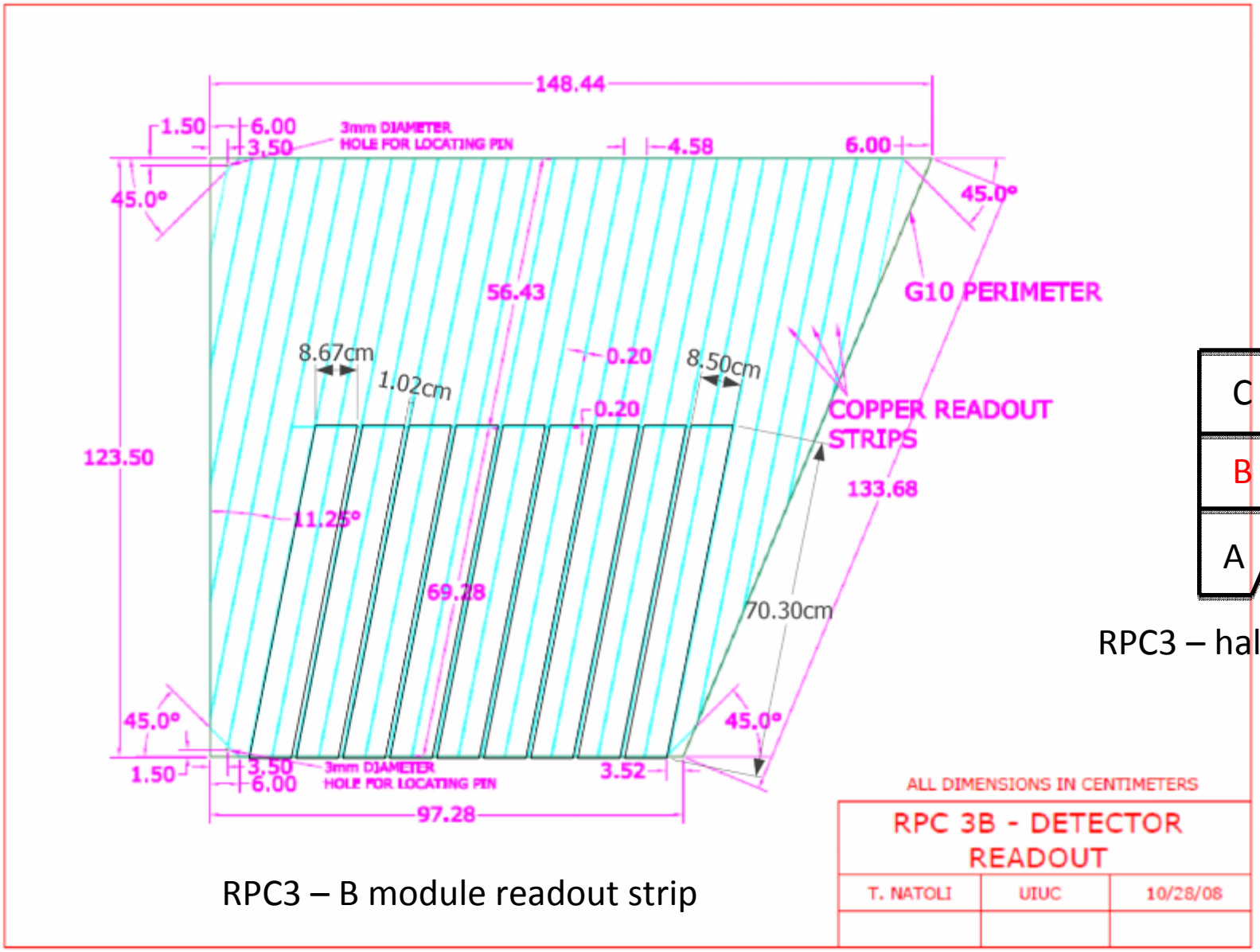
NOTE: MOUNTING BRACKETS ARE SHOWN IN RED

Mounting Points

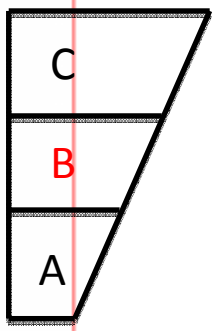


Mounting brackets are on frame profile rails that allow 1-D alignment.
Brackets use ¼” thick bolt or screw.

Paddle-RPC Strip Mapping

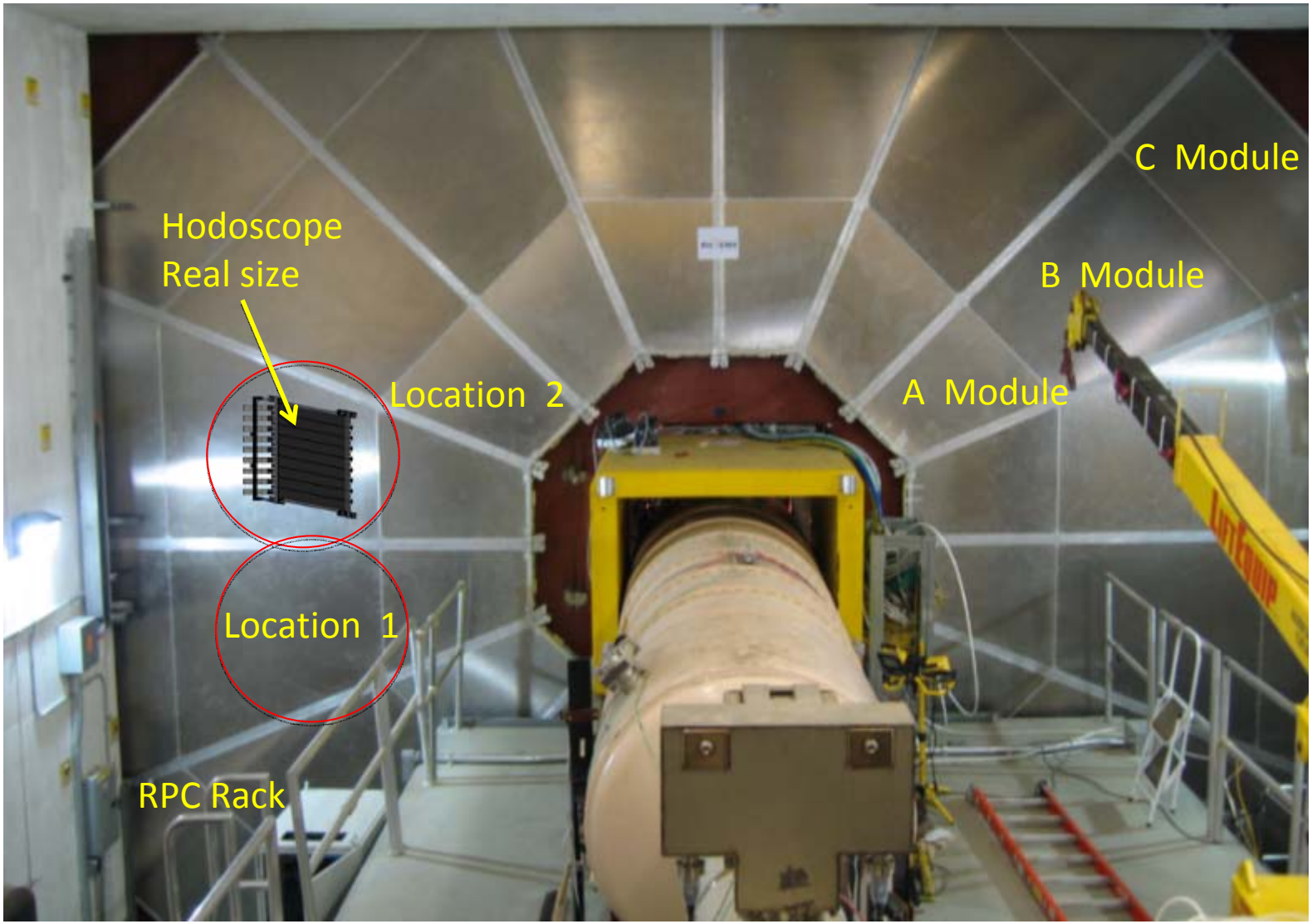


RPC3 – B module readout strip



RPC3 – half octant

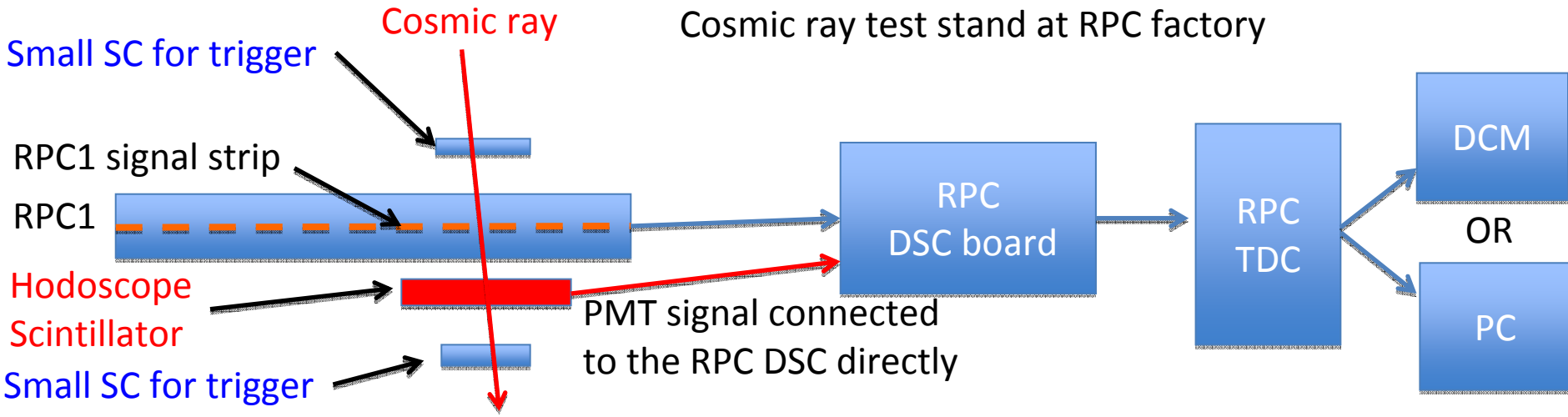
Location of Hodoscope

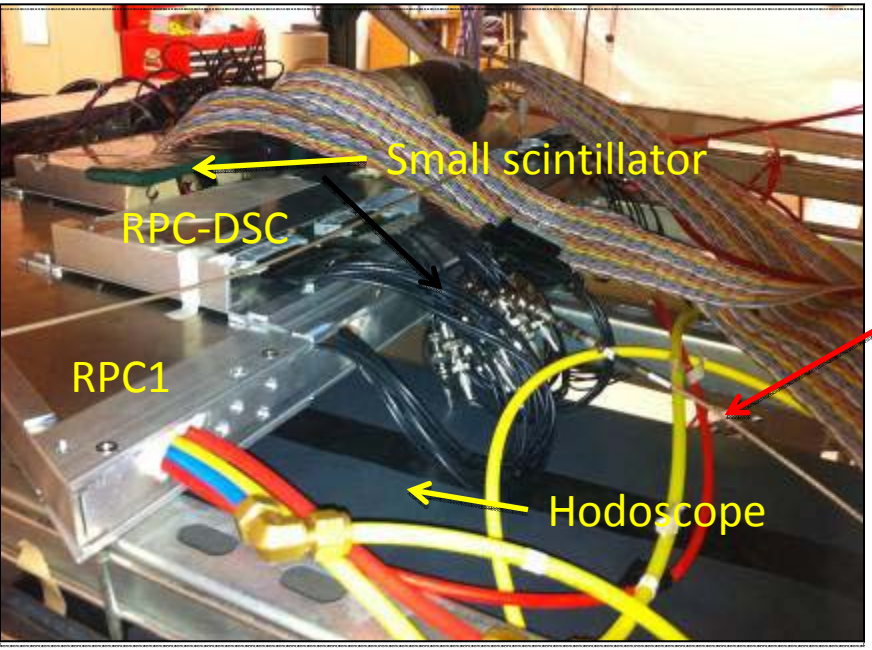


Close to RPC3 electronics rack
Less Beam background region

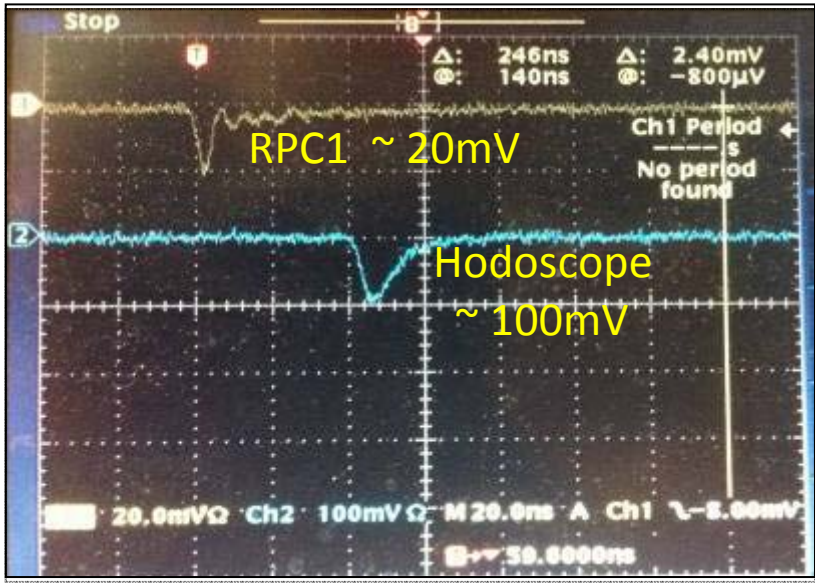
Location 1 or 2 would be good position.
Install at North and South tunnel.

Test : Can Hodoscope Signal be read through RPC Front End Electronics ?

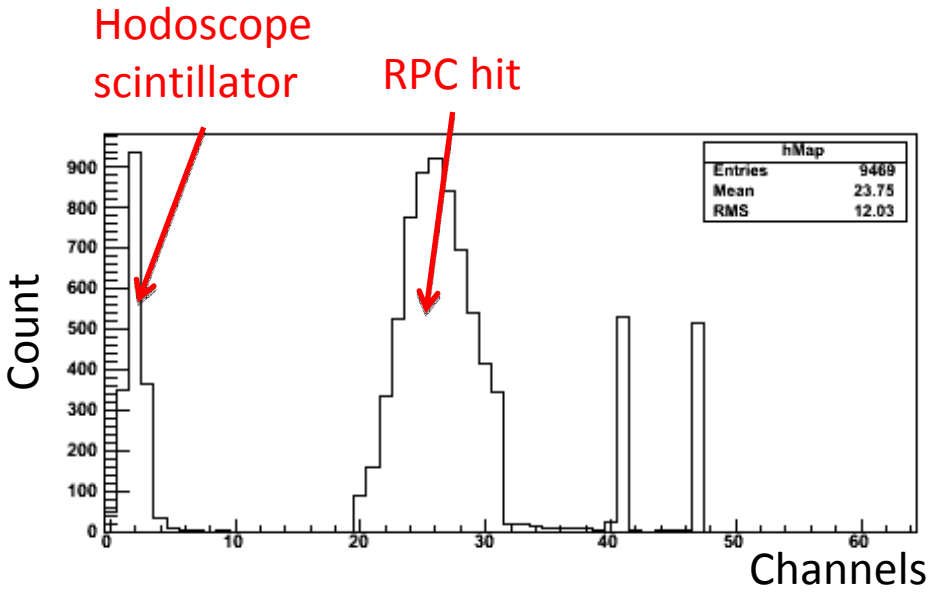




Hodoscope
Input Line



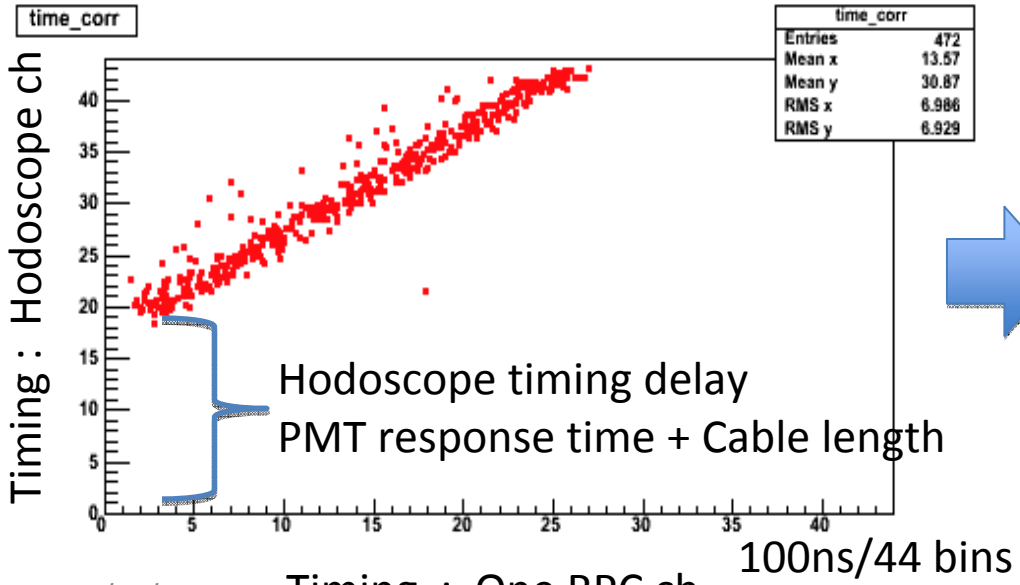
Hodoscope Cosmic ray test results



Hodoscope Efficiency through RPC readout (FEE + TDC)

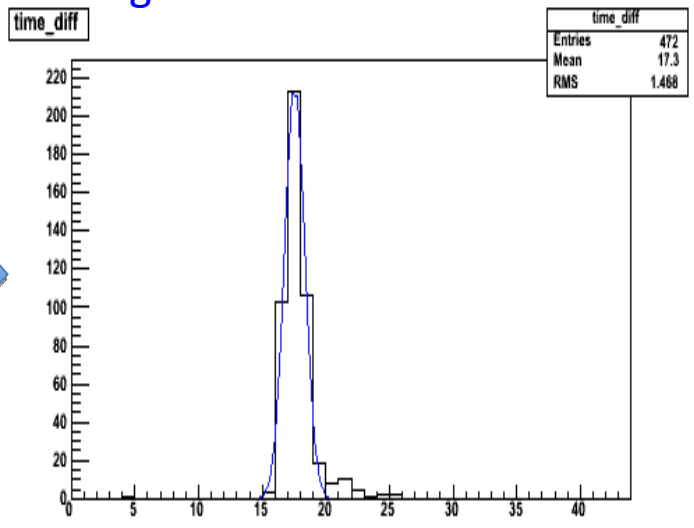
Efficiency = 99%

(Triggered by two small scintillators)



Timing : One RPC ch

Sigma = 0.78 bin = 1.7 ns



Time difference : RPC - Scintillator

Hodoscope Installation schedule and issues

Schedule

- Aug. 2011 : Finalize hodoscope design -> Done
- Sep. 2011 : Order parts and build at UIUC -> Ongoing
  - Scintillator cutting job done
  - Framing materials have been ordered
  - Light guide design has been sent to company
  - Will be assembled 2 hodoscopes by this month (or early next month)
- Oct. 2011 : Ship to BNL and Install at tunnel
- Nov. 2011 : Readout Test

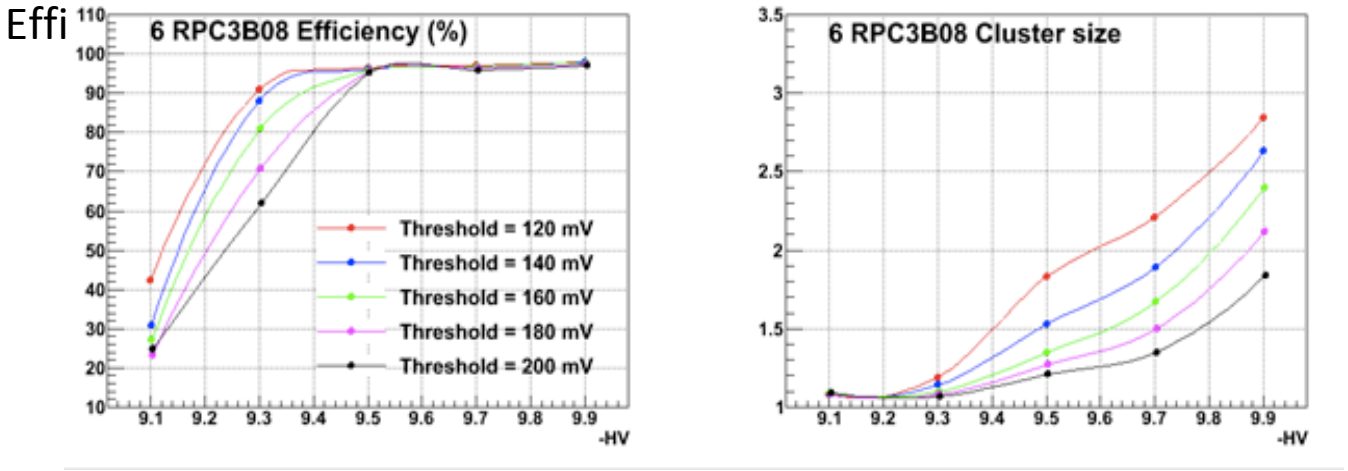
Issues

- Safety - No flammable gas and SF6 required.
- 16 HV channels needed for PMTs. (9 for north and 9 for south tunnel)
- Need a mounting structure on the RPC3.
- Hodoscope also can be used for beam background monitoring.

backup

RPC3 Efficiency in Factory and Tunnel

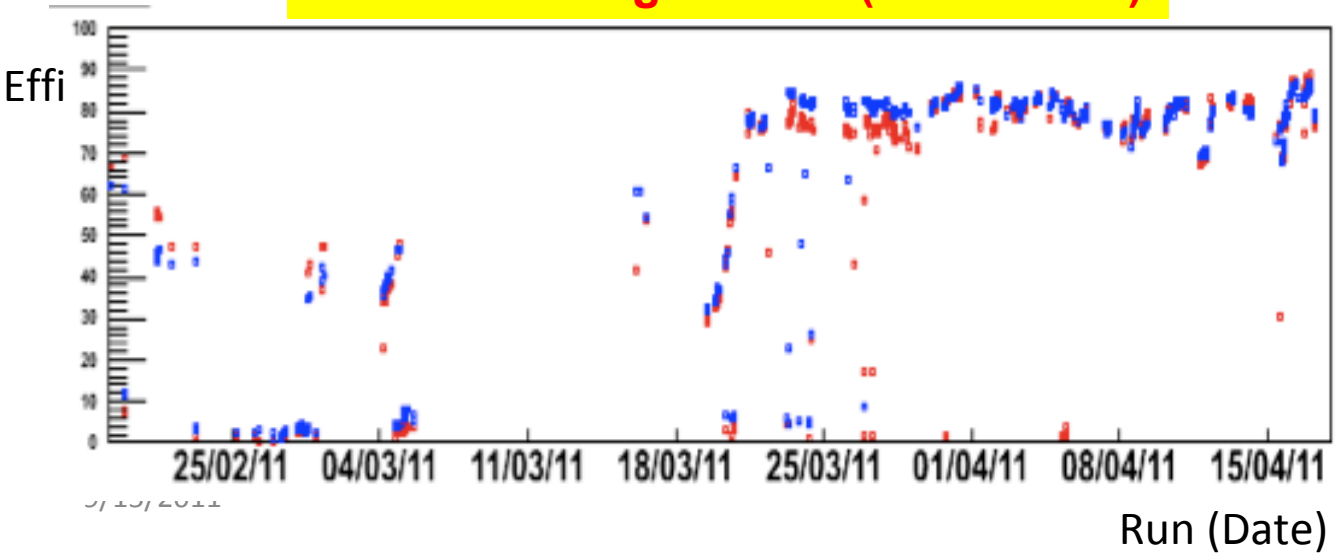
ε ~ 95% at the RPC factory



Cosmic ray test stand
In RPC Factory

One B module

ε ~ 80% During RUN 11 (500GeV PP)



From reconstructed
Muon track - Run11
500GeV PP

All modules averaged
Blue : South
Red : North

Hodoscope Budget

from Daniel Jumper (UIUC)

Funds available from existing equipment and NSF grant at the University of Illinois Urbana-Champaign.

Support Structure:

- Materials: $210 + UIUC Materials
  - Includes extruded aluminum bars (some UIUC provided) and rubber padding
- Hardware: $335
  - Screws, T-Nuts, Brackets, etc.

Total: $545 + UIUC Materials

Scintillators:

- Scintillator Material: UIUC re-used scintillator (to be cut to size)
- Light Guides: $450
- Wrapping + Etc: UIUC Materials
- PMTs UIUC Materials

Total: $450 + UIUC Materials

Labor:

- Shop & assembly work: To be done by UIUC technicians and students listed below
  - John Blackburn – UIUC Technician
  - Daniel Jumper, Cameron McKinney – UIUC Graduate Students
  - Max Candocia, Emily Zarndt – UIUC Undergraduate Students

Grand Total: $995 + UIUC Labor and Materials

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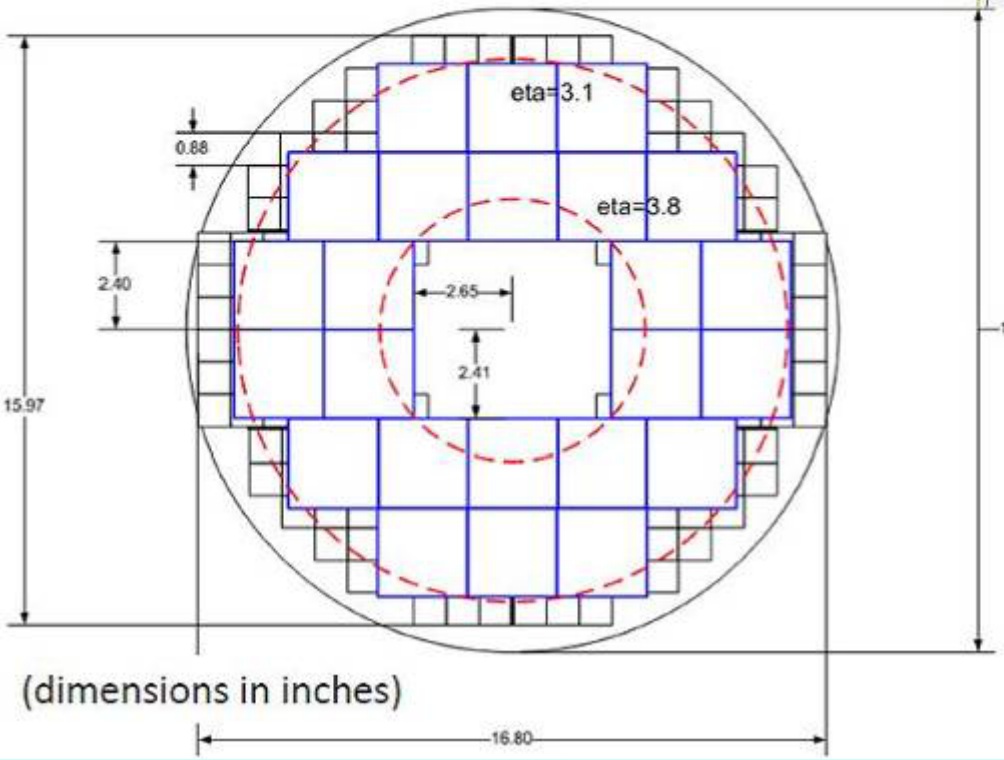
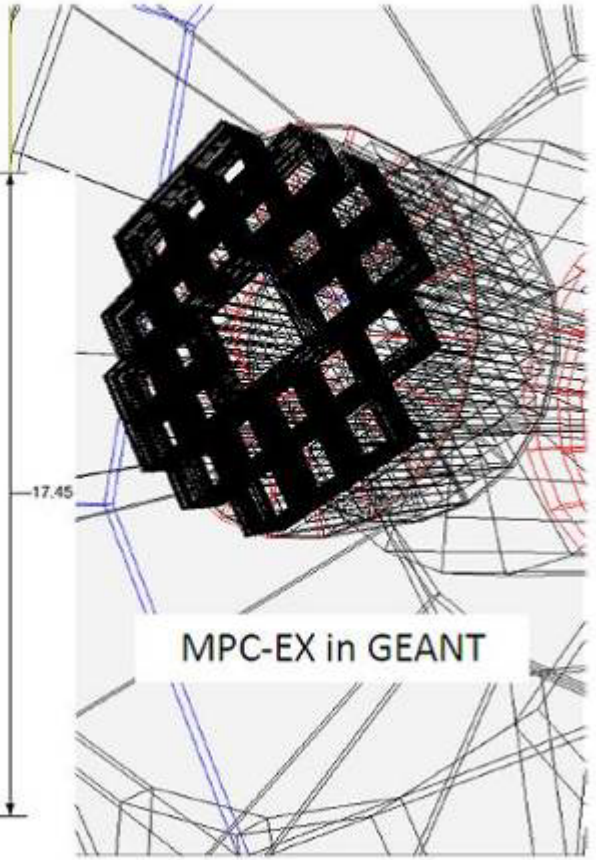
Need shed for R134A bottles close to GMH.
No heating in shed (except heating blankets), lines to be insulated. Last year heating blankets kept gas warm but long length of pipe allowed gas to liquify on coldest days.

Possible location for shed 8' deep with 10' x 8' doors, and with bottom and top openings.. should satisfy ODH issues ~$2K.

Design of the MPC-EX

Detector is designed around 6.2cm x 6.2cm modules (Si pad or strip detectors) separated by 2mm tungsten plates.





From John LaJoie's DC slides

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- Roof leaks in utility bathroom at northwest corner behind tech offices, over door between rack room and assembly hall, over door between control room and elect. ass'y room, southeast corner of IR and laser room.

- Flooding in AH/ Driveway heaving

- Electronics test/assembly room-to-parking lot door (does not open/close/lock properly – needs to be replaced)
- Temperature in utility hall (where new air compressor is installed) is exceedingly high (transformer cases as high as 135 F)

Safety, Security, Etc.

1. Summer ends next week and the fall begins. Let's keep our good safety record intact:

   - Take care when walking in the IR
   - Hats on when crane is in use
   - Be careful on scaffolds and ladders
   - Remember the 2 person rule
   - Abide by combined space rules
   - Proper work clothing and shoes at all times
   - If you see someone breaking the rules say something
   - No tourists in the IR unless approved by Carter, Ed or Don
   - Take the time to do things safely

2. Tier 1 inspection yesterday – No significant problems

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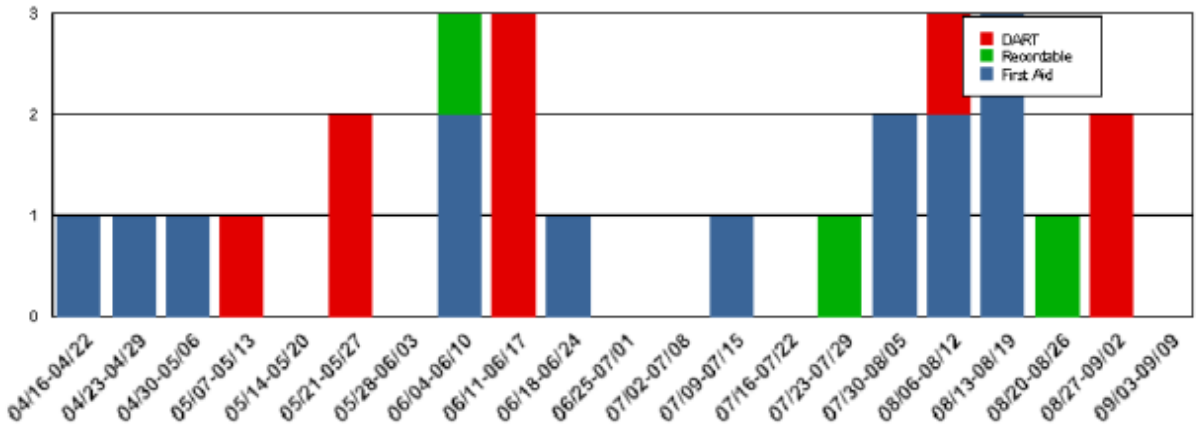
Injuries Per Week
As of 9/9/11



Injury Status:
FY11 YTD: DART – 27, TRC – 41, First Aid – 38
FY10: DART – 17, TRC – 32, First Aid – 52

Recent Injuries		
8/30/11	DOE Recordable DART	An employee was leaving work by bicycle and was struck by a deer. He was transported to the ER by Fire/Rescue and admitted and was diagnosed with broken clavicle and ribs. This is a DART case.
8/29/11	DOE Recordable DART	Employee was climbing in and out of an interior trench and reported to the clinic a week later that he had experienced pain in the lower back and thigh. Employee has lost time as a result. This is a DART case.

Recent Events		
9/1/11	Non-Reportable	Fire rescue responded to Bldg 832 as a result of a condensate pump motor overheating. The motor was de-energized by opening the electrical supply breaker. No fire was evident.
8/30/11	SC-BNL	Fire rescue responded to Building 98 for two one-liter bottles of dichloromethane that were found to be improperly sealed upon receipt from the manufacturer. The Chemical Mgt staff (already wearing gloves) placed the bottles into a 5 gallon bucket; personnel were evaluated at scene for possible chemical inhalation exposure and then released. IH, ES&H and Waste Management responded to scene and took custody of over packed container. Sampling determined there were no overexposure to personnel. There was also no requirement to notify external regulatory agencies.

Where To Find PHENIX Engineering Info

Links for the weekly planning meeting slides, archives of past meeting slides,long term planning, pictures, videos and other technical info can be found on the PHENIX Engineering web site:

http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL_SSint-page.htm