

# PHENIX WEEKLY PLANNING

3/13/2008

Don Lynch

# Shutdown '08 Schedule

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CM Crane Review	Feb-Mar 15
New Beam Pipe Design	Feb
Complete Run 8,	Mar 12
MuTrigger Prototype Tests	Feb 27-March 15
Purge Flammable Gas, Magnet & DAQ Tests	Mar 12-14
Remove lock-out & open shield wall	Mar 14
Mu Trigger Review	Mar 14
RPC Prototype C tests (in tent)	Feb- Mar
Disassemble & store shield wall & base	Mar 17-21
Beam pipe design review	mid Mar
IR Crane certification	Mar 14
Remove Collars	Mar 17-18
Disconnect EC & move to AH	Mar 17-April 4
Move MMS south	Mar 26
RPC Prototype engineering & safety review	Mar 28
Inventory/test assembly of MMN scaffold	Apr
Install CM access stairs	Apr 7-11
RPC Prototype D tests (in tent)	Apr-May

# Shutdown '08 Schedule, cont'd

TECHNICAL SUPPORT + 2008

Design RPC installation fixtures & FEE platforms	Apr-May
MuTrgr Platform review	mid Apr
Move CM South (MuTr Decaps?)	Apr 15 (tax day)
PC1 west work (needs planning)	Apr 1-30
Install CM Crane	May
Remove North access & MMN 4 lampshades	May
Install Station 1 North scaffolding	May 1
Station 1 North decaps	May
RICH air control move to DC Rack	May
Prep work for Mutrgr platforms (water/elec)	May-June
Prep work for RPC proptotype install	May-June
End of run Party	May 30
Erect MMN scaffolding	June
MMN decaps	June-July
RPC engineering & safety review	mid June
MuTrigger FEE N Install	July
HBD Install	July-August

# Shutdown '08 Schedule, cont'd

TECHNICAL SUPPORT + 2008

RPC prototype gas system	July
Move shielding for RPC prototype installation	July
RPC prototype cable routing & support	July
Modify crystal palace & vapor barrier	July
Install MuTrigger FEE N platform	July
RPC prototype install	August
Install RPC prototype rack in tunnel south	August
Install Mutrigger FEE's in MMS for RPC test	August
Install MuTrigger FEE South platform	August
Install MuTrgr N&S rack cooling & electric	August
Install MuTrigger N cooling water & air	August
Replace tunnel shielding	Sept
Connect electronics/gas/water/air for RPC	Sept.
Install MuTrigger N& S racks	Sept.
DC East?/West Repairs	Oct.
Remove all installation equipment	Oct.
Prep for run 9	Oct
Close shield wall start shifts	Nov
Start physics	Dec.

# Design Reviews

- CM Crane (analyses complete need meeting with info sent to LSC (lifting safety committee, waiting for date)
- Mu Trigger FEE N & S 3/14
- MMN Scaffolding (design submitted to C-A for review, 3/19?)
- Station 1 Scaffolding (DESIGN IN PROCESS) (3/19)
- New Beampipe Review (ready for review, drawings sent to vendor for quote 3/21?)
- RPC Prototype 3/28 (Prototype design, installation, gas system, electronics, safety) (Need to secure date)
- MuTrigger N & S rack platform 4/21-5/2 (On deck for design)
- RPC Stations 1, 2 and 3 ~ 6/22-6/20
- VTX/FVTX review ~ 6/1-8/31
- NCC Review ~ 6/1-8/31
- MMS scaffolding (< 2009)

- Overall Lead - Carter
- MuTrigger Mechanical Install (including scaffolds) - Jimmy
- MuTrigger FEE Water and Air - John T.
- MuTrigger Cabling and Fibers - Frank
- RPC prototype mechanical install - Kenny
- RPC tent support - Kenny
- MuTrigger FEE and RPC rack mechanical ass'y and installation - Mike L.
- MuTrigger FEE and RPC rack electrical ass'y and safety systems - Frank
- RPC prototype gas system (mixing house) - Carter
- RPC gas system plumbing - John T.
- RICH air control move - Carter
- MuTr decaps - Kenny
- Crane Installation, CM stairs, Shutdown startup and button up tasks, All
- HBD Reinstall - Mike L.
- NCC, VTX, FVTX support - Mike L., good Sal
- PC 1 & DC West - Jimmy
- Rack Electronics, Misc. electrical good Sal, Frank

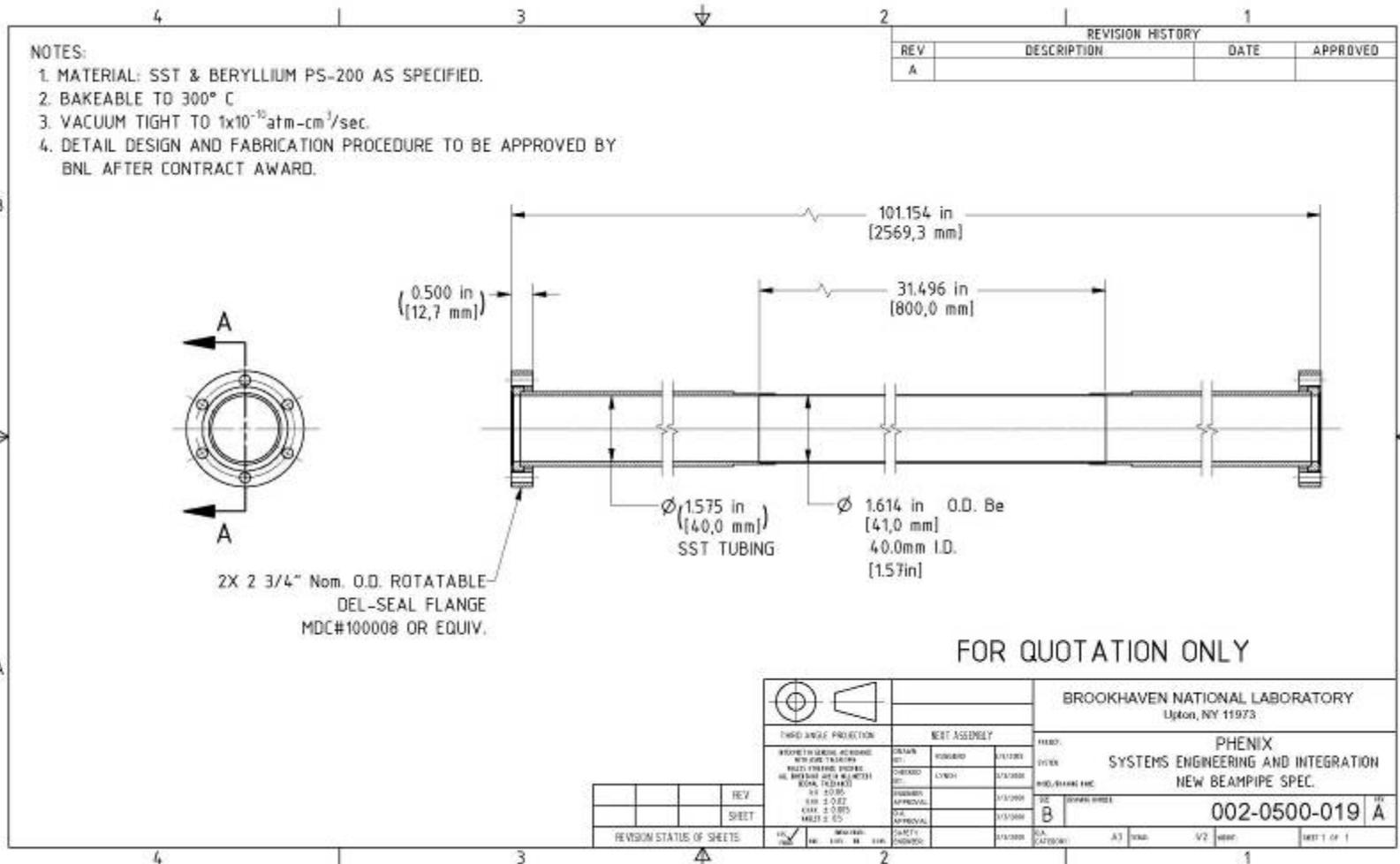
# Work Permit Requirements

- Standard Shutdown Commencement tasks (covered by approved procedures)
- PC1 Repairs
- CM Crane Installation
- MuTrigger FEE Upgrade (North & South) & MuTr Decaps, (including confined space for MMS & MMN and scaffold installation)
- RPC Prototype Installation
- HBD re-installation
- MuTrigger FEE rack platform installation
- (More will be needed - to be added to the list as appropriate)

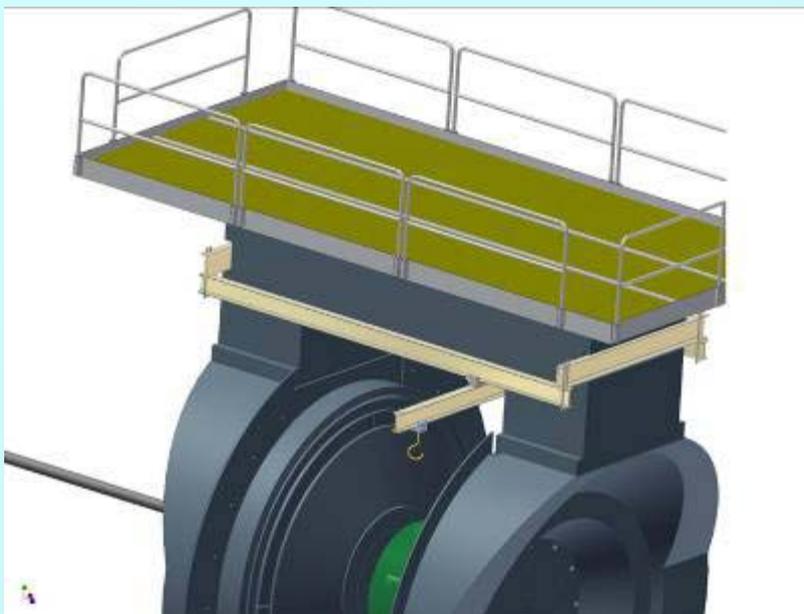
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# New Beampipe Design & Review

TECHNICAL SUPPORT 8002



## CM Crane



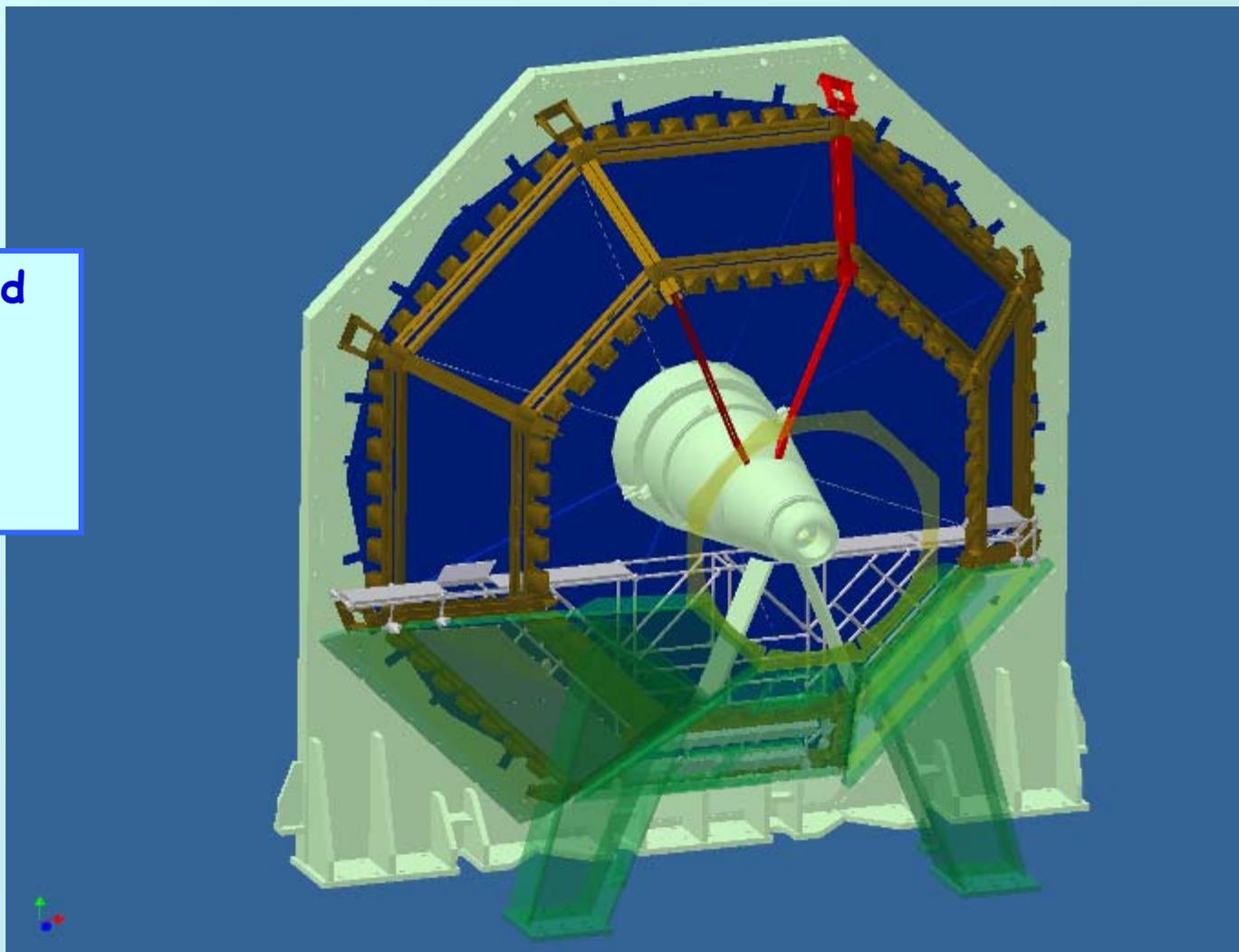
- Uses Gorbel 1-ton capacity Ceiling mounted Bridge Crane, modified to be supported by 2 Steel Channels attached to CM
- Engineering analyses submitted to LSC.
- Crane Design ready for review
- Additional info from Crane mfr. Requested.

Waiting for design review.

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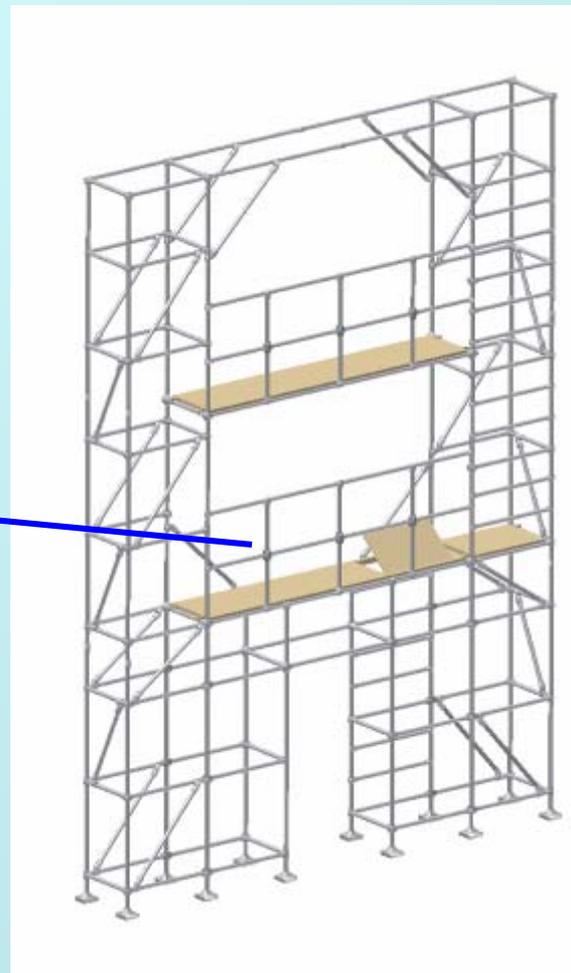
Design submitted  
to C-A

Expect review  
next week



# Station 1 Scaffolding

PHENIX - PROJECT SUPPORT NUMBER

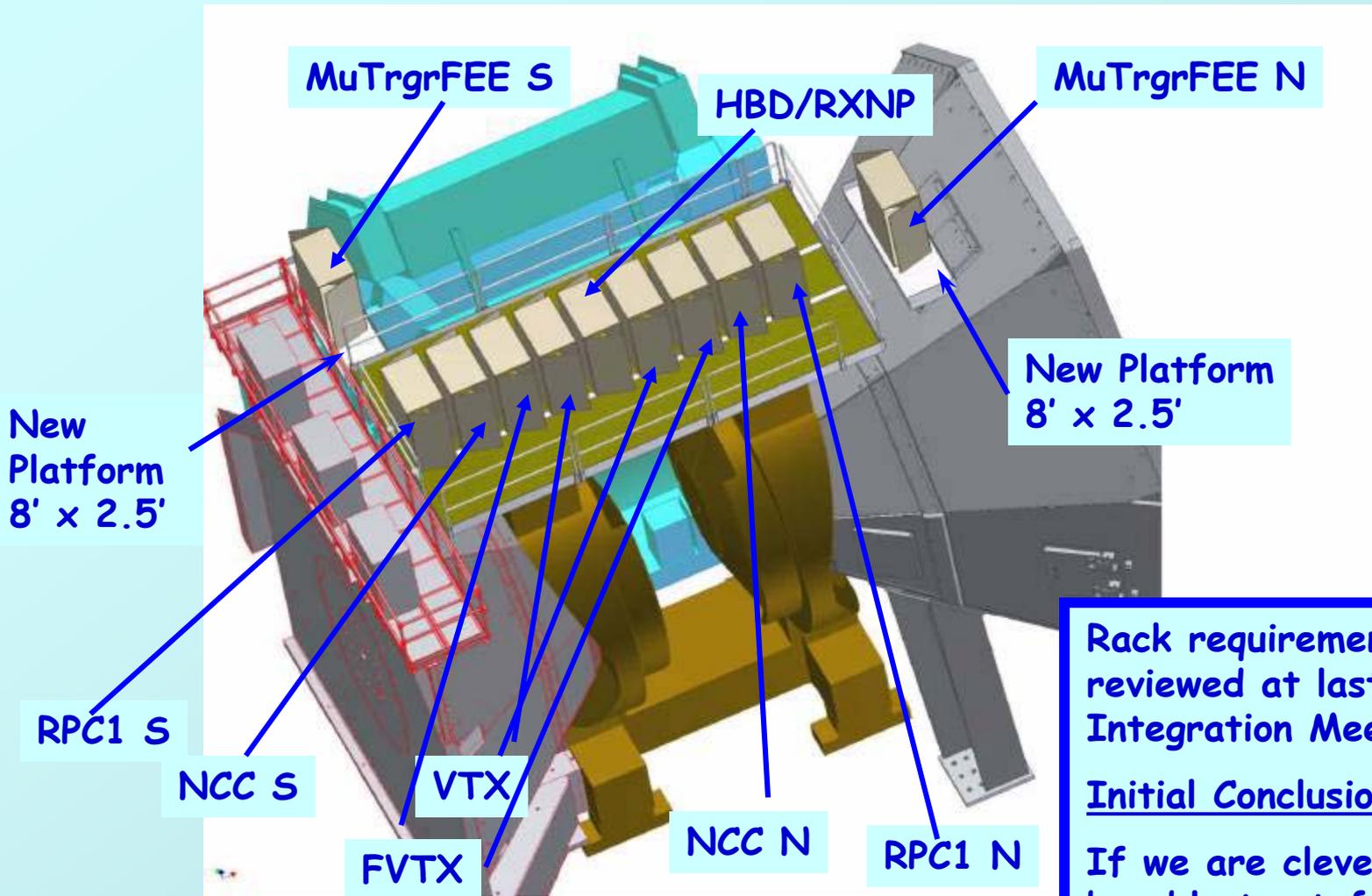


Design in Progress

Possible review next week.

# New Rack Allocations

TECHNICAL SUPPORT ROOM



Rack requirements reviewed at last week's Integration Meeting:  
Initial Conclusion:  
 If we are clever we may be able to stuff it all in as shown.

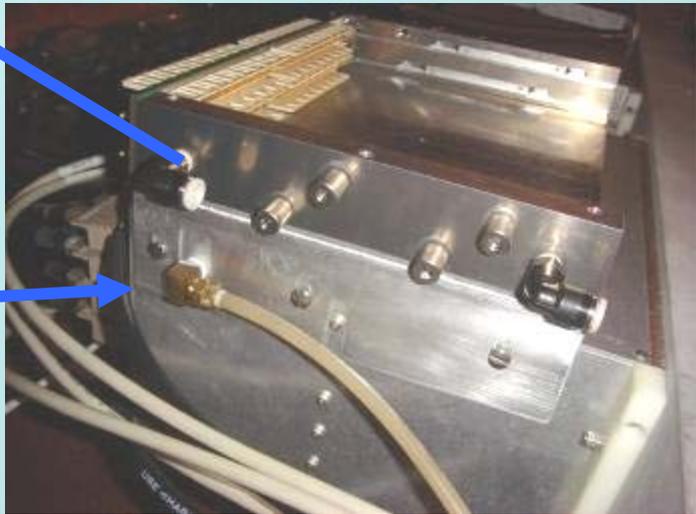
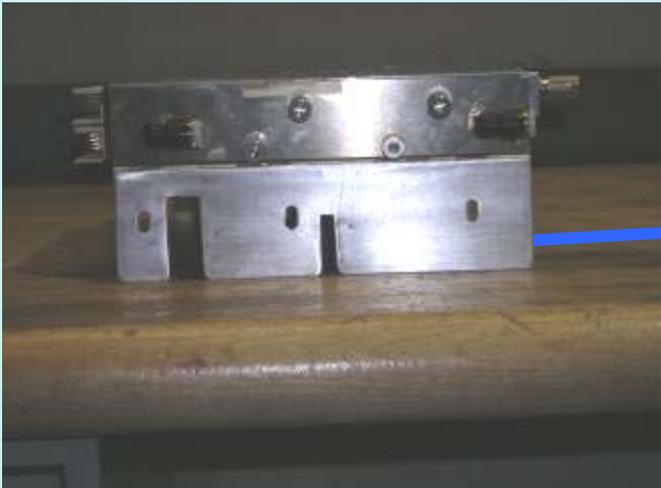
MuTrigger FEE



C-A Safety review tomorrow

Itaru - Intro and Electrical

Don - Mechanical and Installation



# MMN Cable Management

Mu Trigger FEE Cable Management:

116 12AWG LV cables for North + fibers

100 12AWG LV Cables for South + fibers

Need power and water to racks

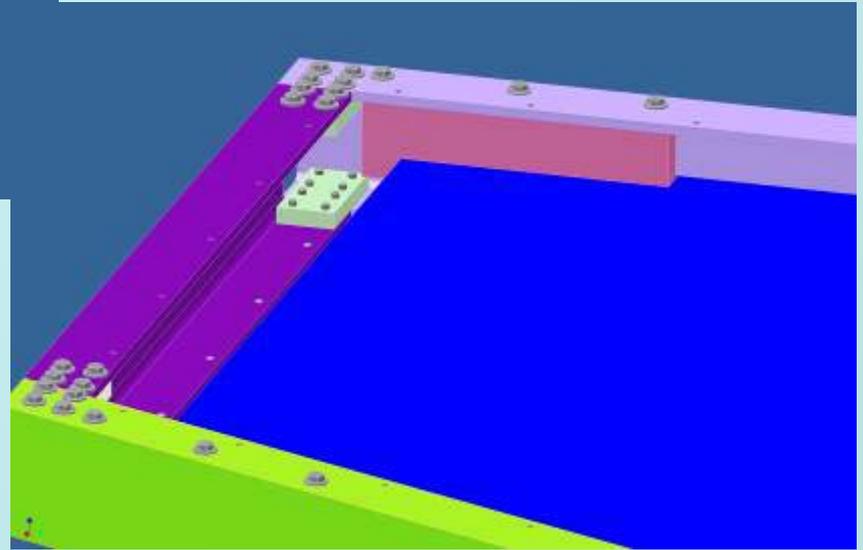
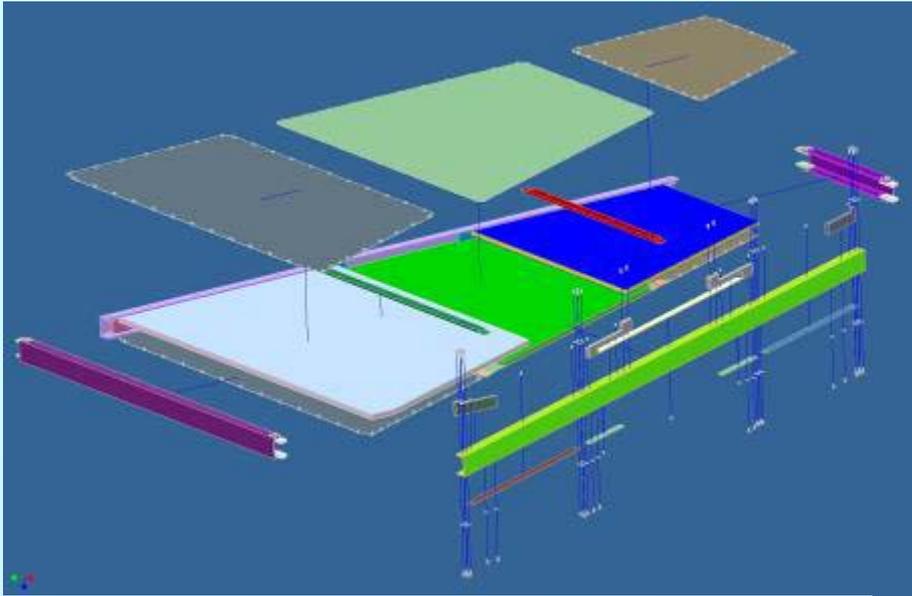
Need to consider RPC2 N installation



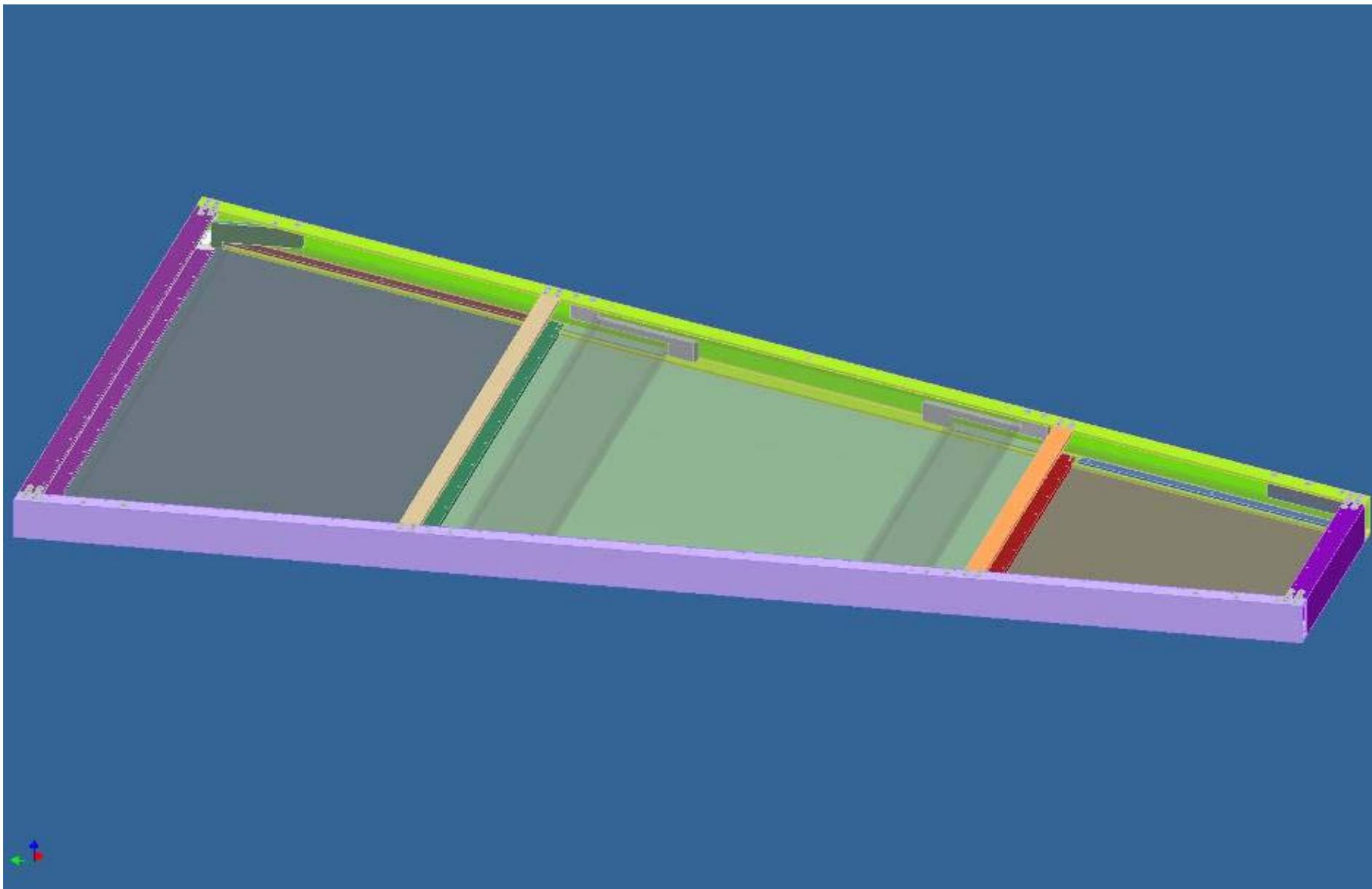
# RPC Design & Installation Challenges



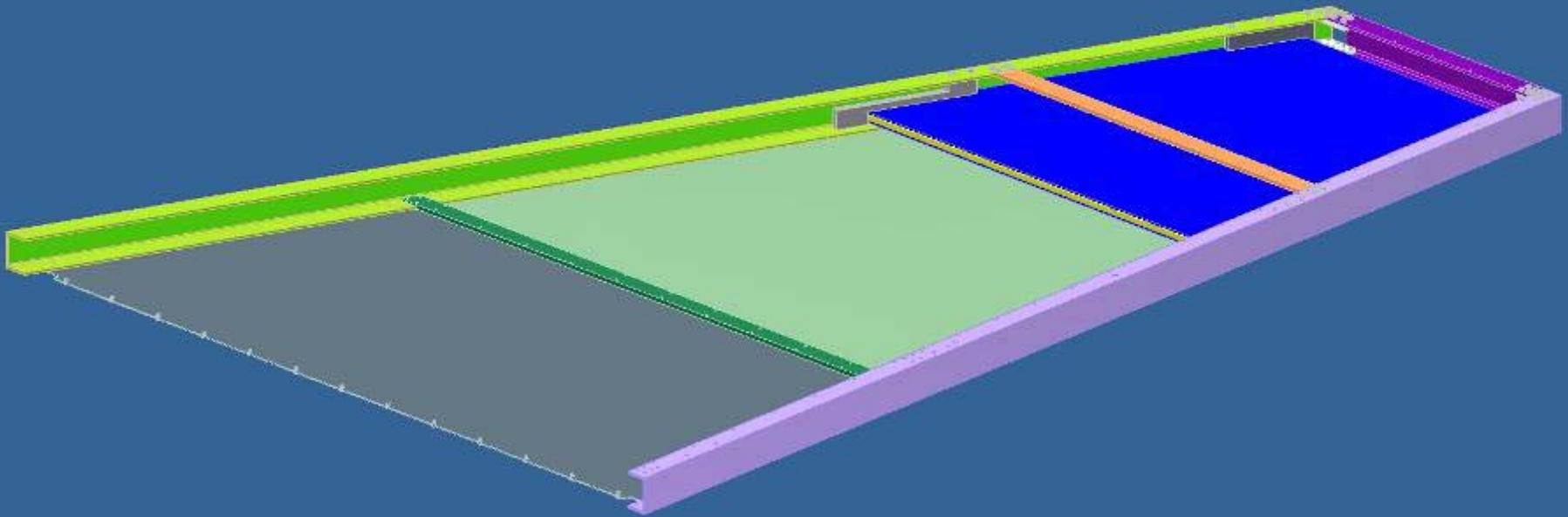
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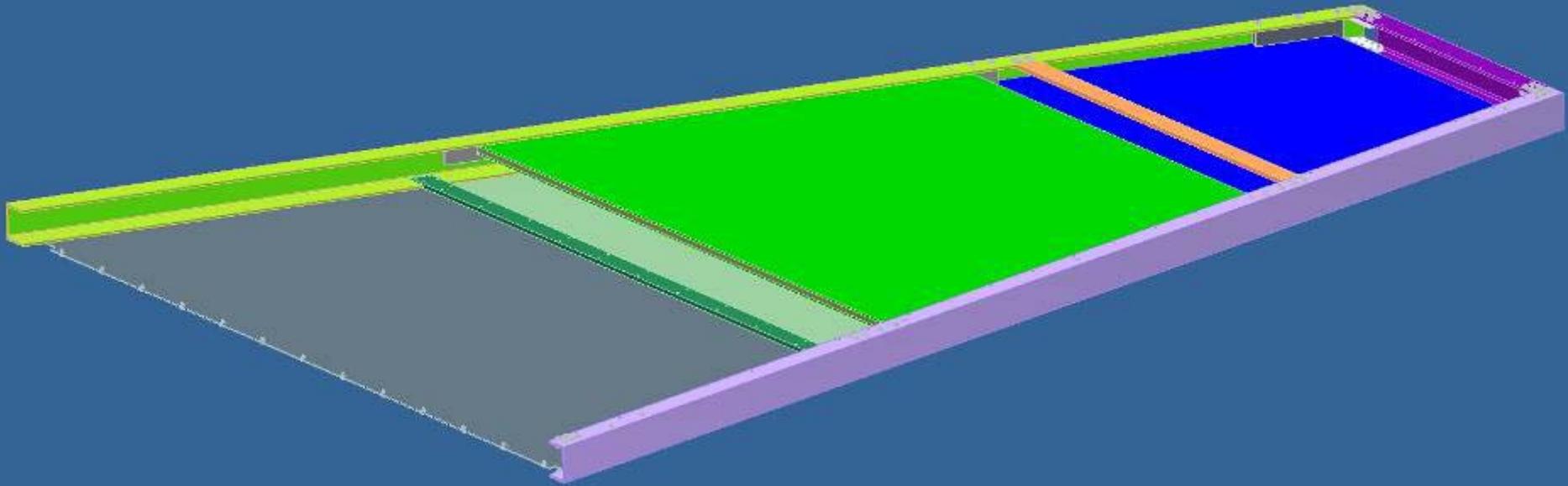
All three detectors rendered transparent



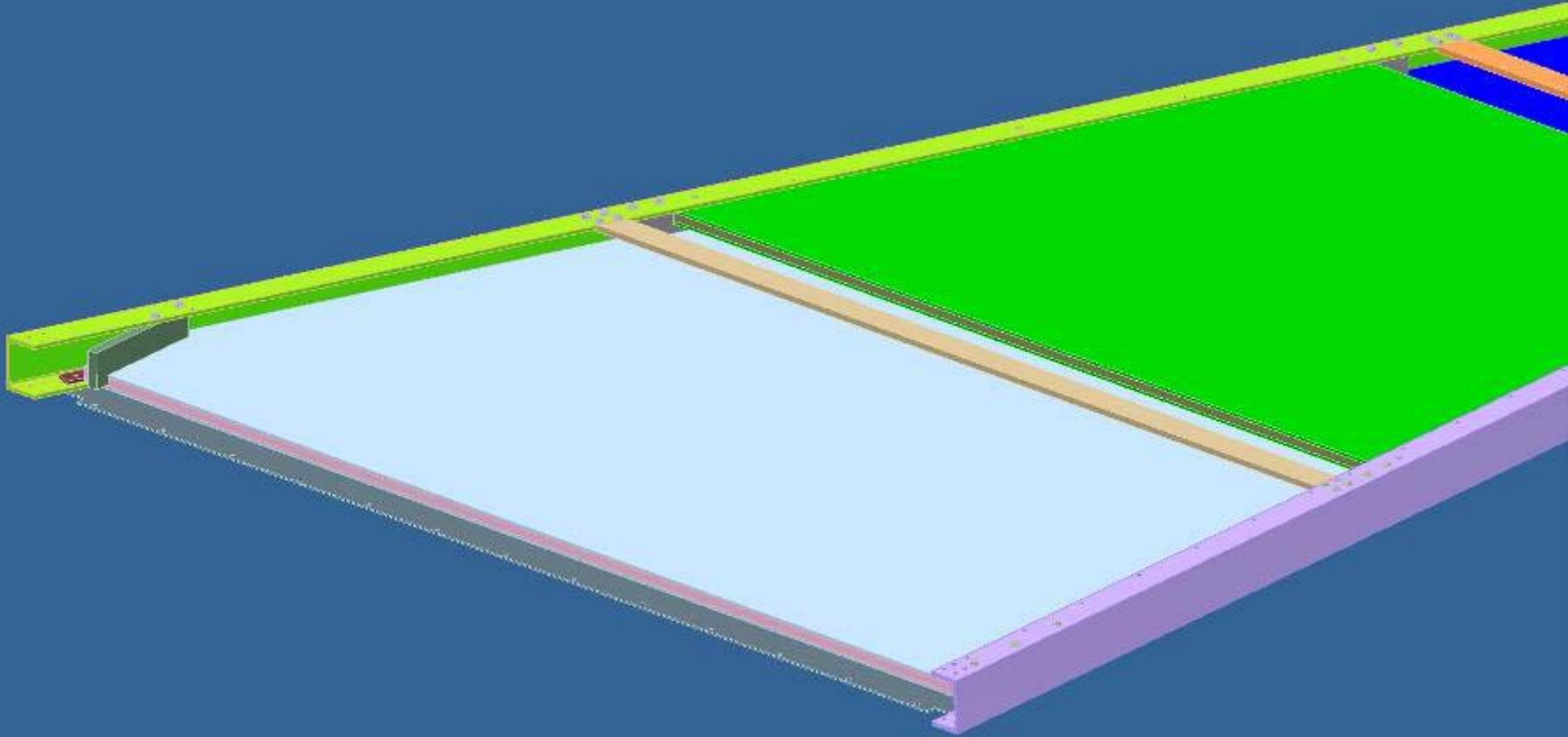
Step ~1 (in a very rolled up installation series)—After the frame is partially assembled, put in Detector A



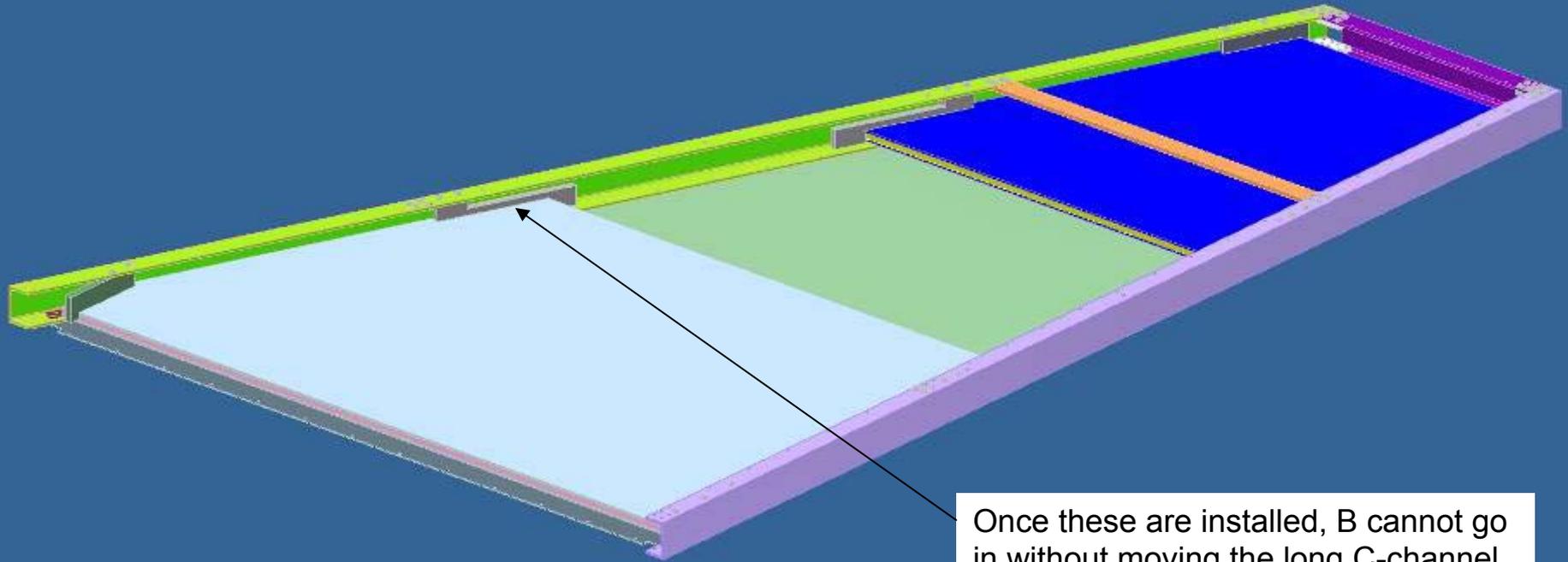
Step 2—Put in Detector B, fasten a few pieces of support hardware



### Step 3—Install Detector C by slipping it in

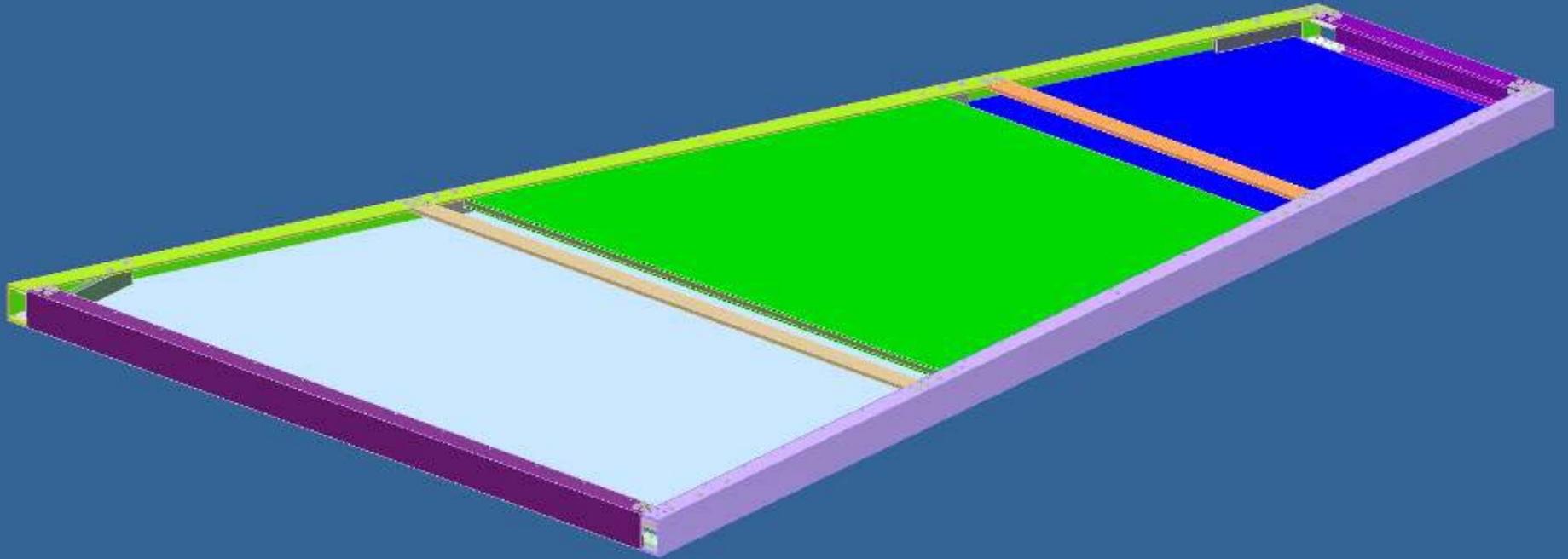


## Why not this order of assembly? (A-C-B)

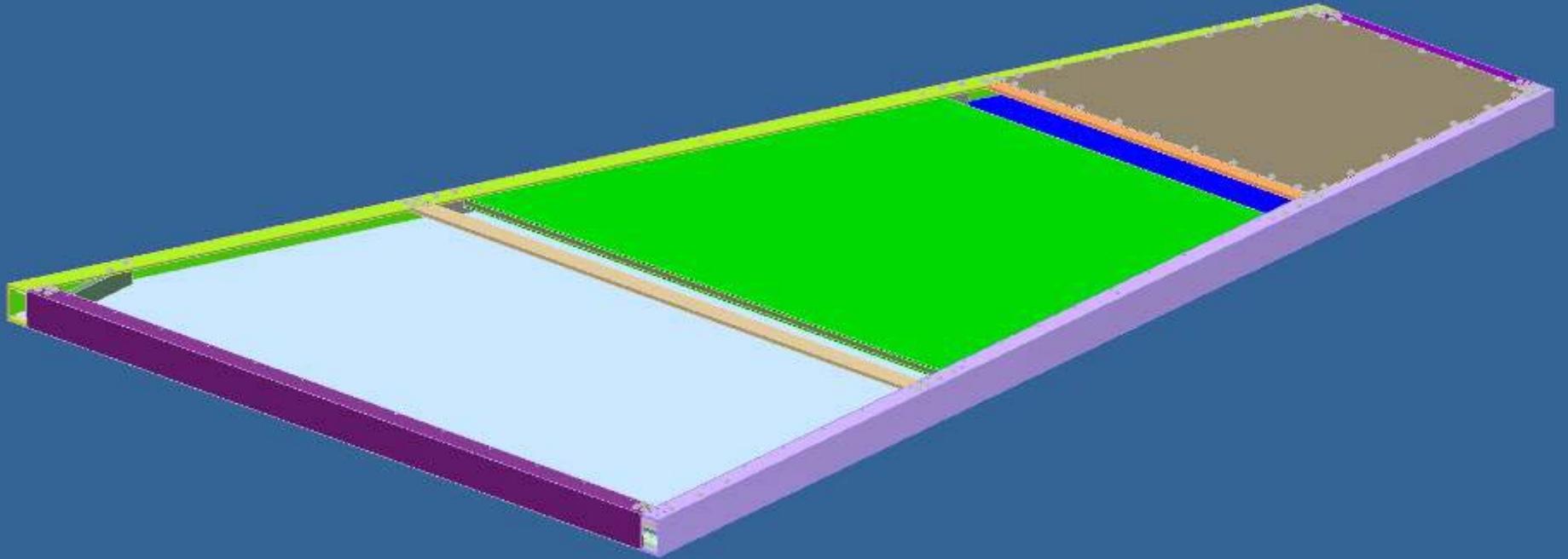


Once these are installed, B cannot go in without moving the long C-channel away from the assembly (and disengaging it from the other two already installed). If they are left out, then they cannot be installed with B in place.

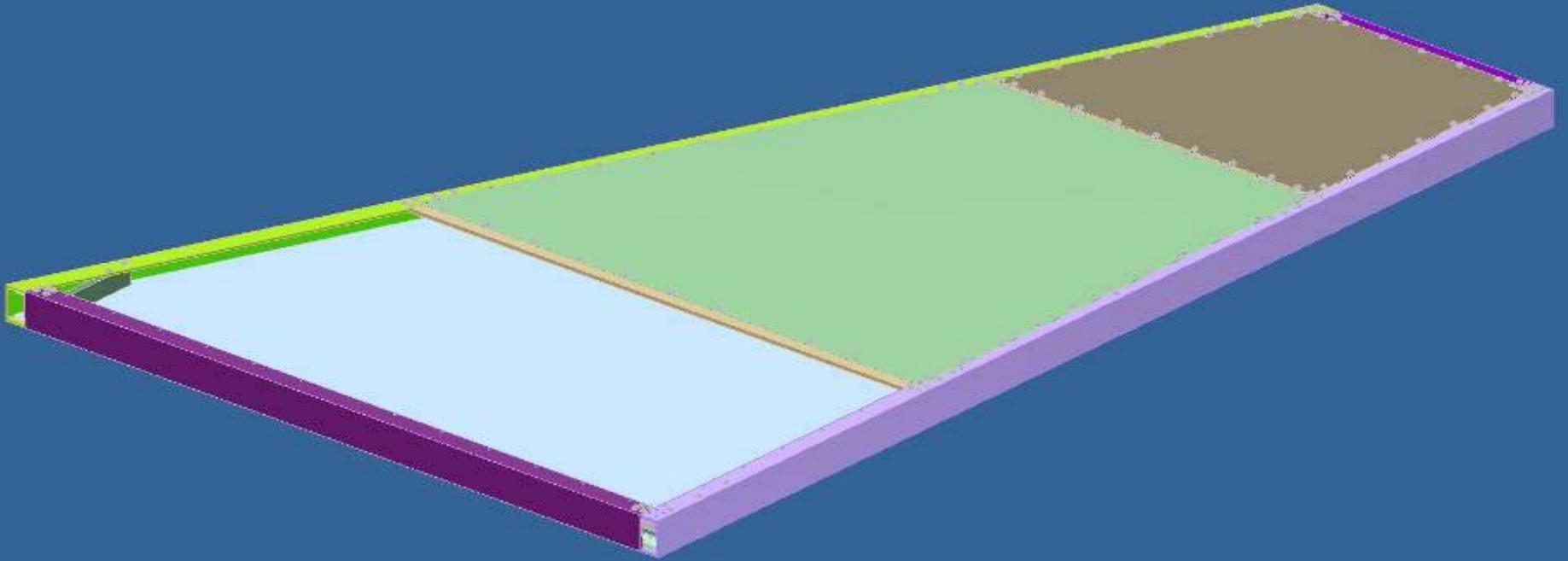
## Step 4—Outer C channel installed



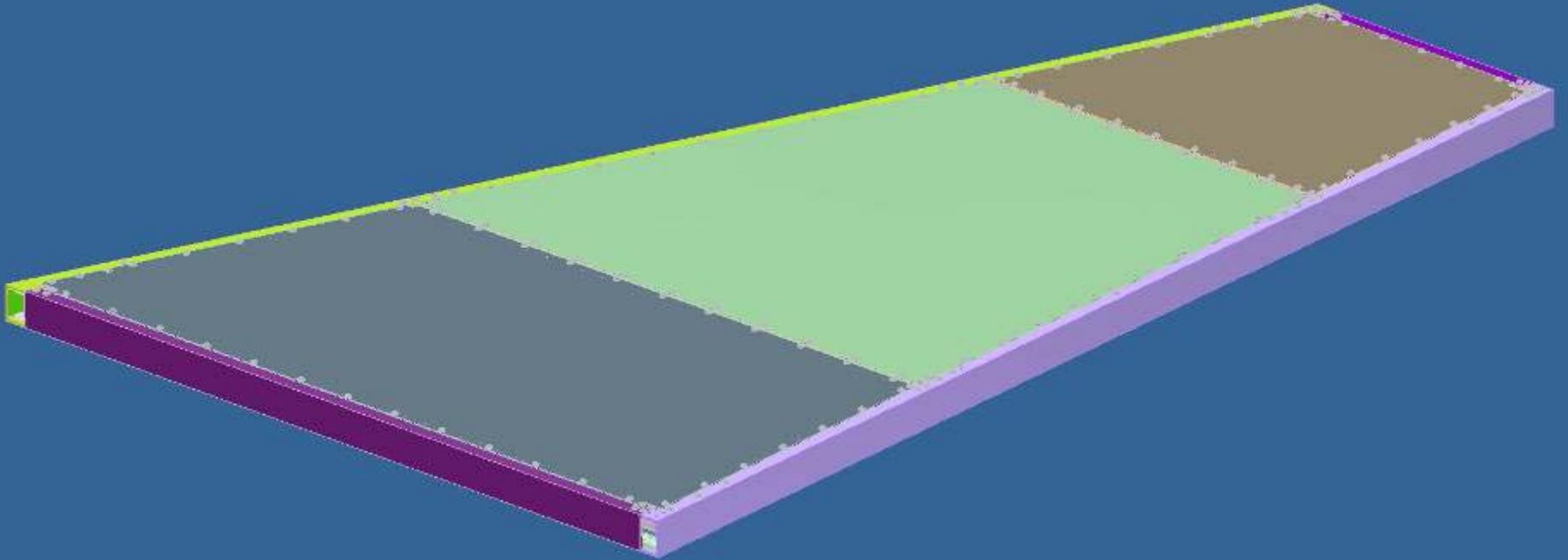
## Step 5—Inner radius cover plate bolted on



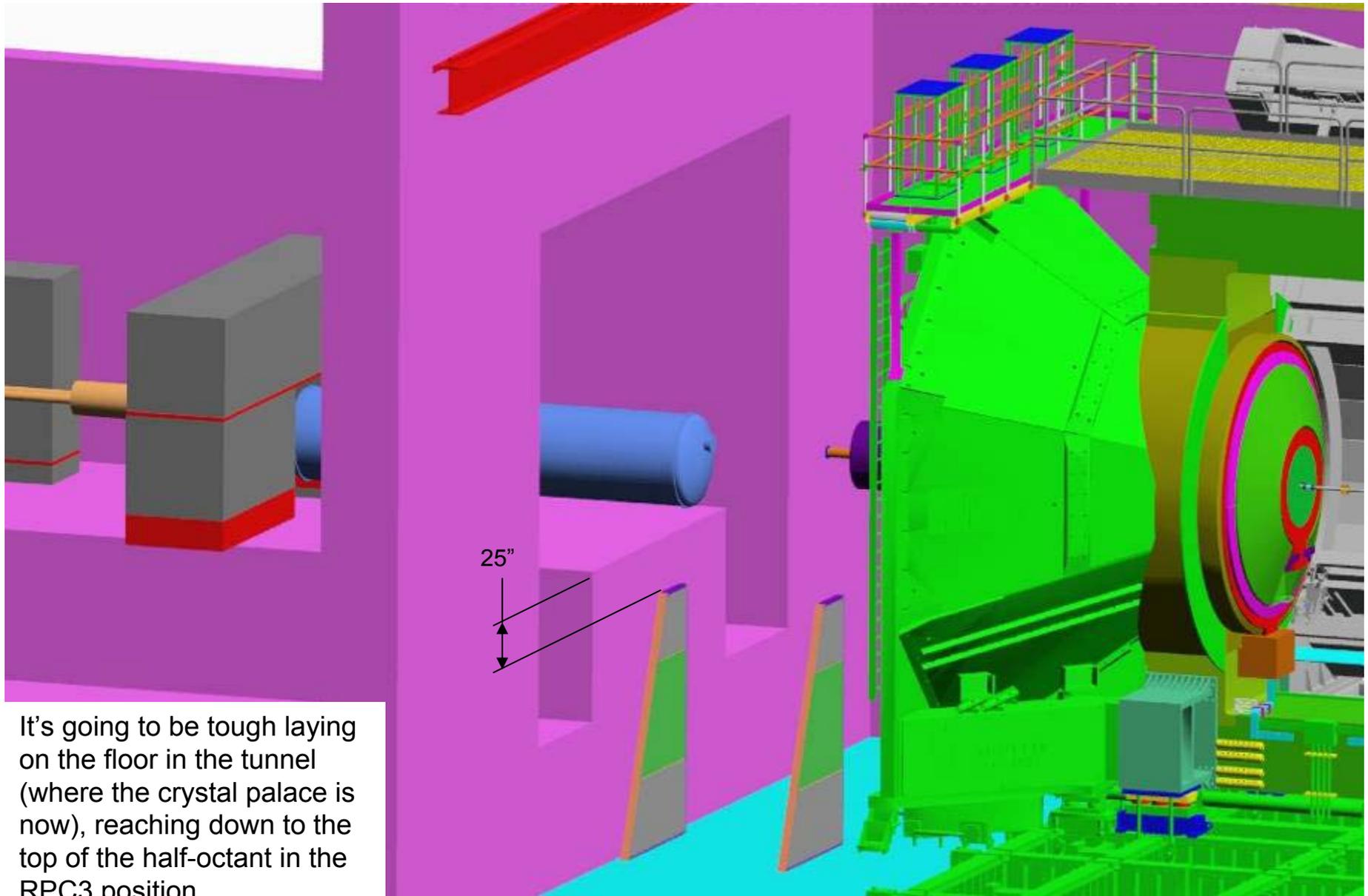
## Step 6—Middle radius cover plate bolted on



## Step 7—Outer radius cover plate installed



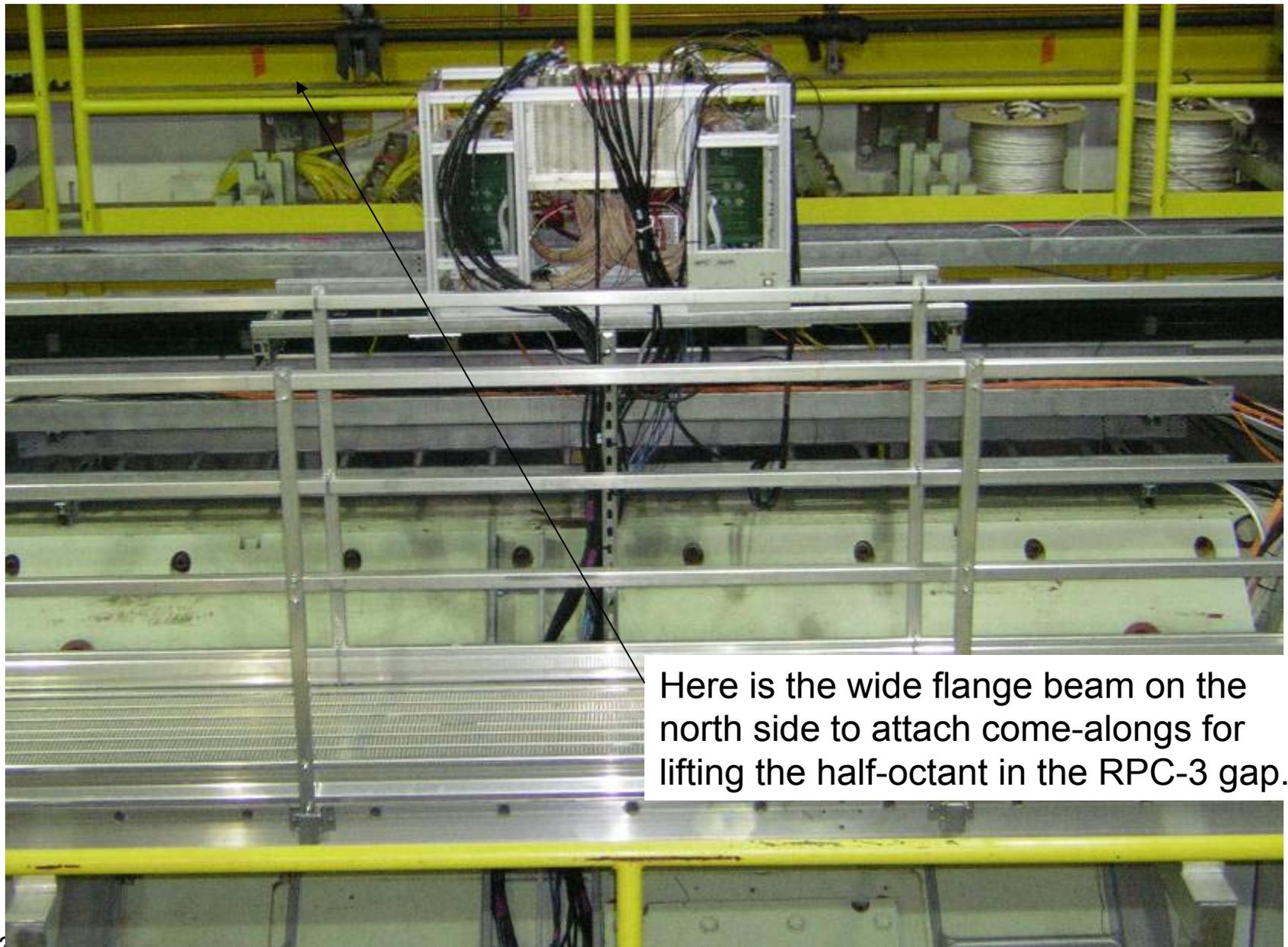
# View with South Muon ID turned off showing RPC 2 and 3 positions



It's going to be tough laying on the floor in the tunnel (where the crystal palace is now), reaching down to the top of the half-octant in the RPC3 position

## A close-up of the area people have to work in to rig the half octant into the gap





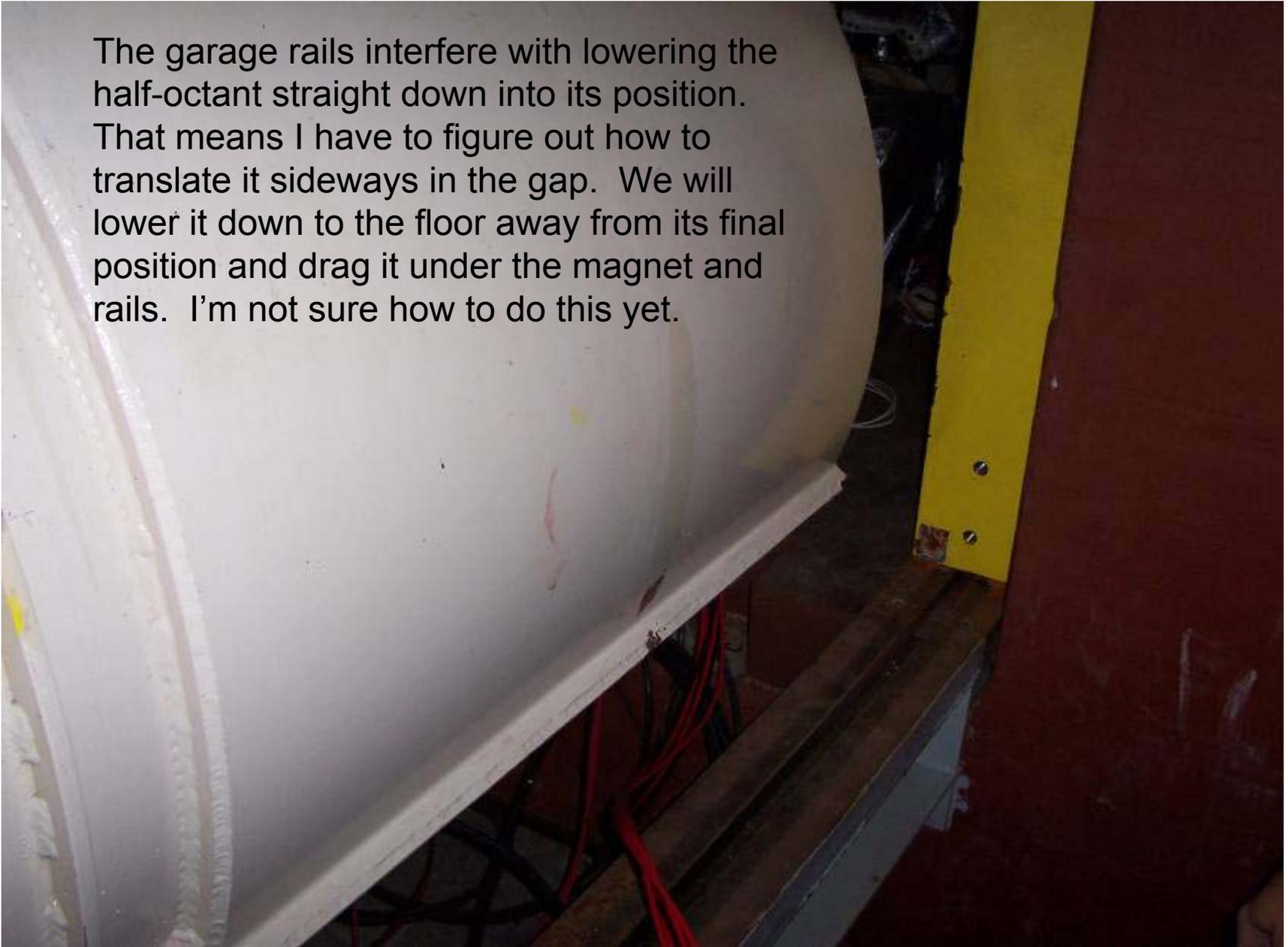
Here is the wide flange beam on the north side to attach come-alongs for lifting the half-octant in the RPC-3 gap.

This photo was taken on the north end, but the south is similar in the seismic bracing for the muon ID steel plates. All of this stuff will be in the way trying to rig the RPC-3 half octant in the gap. We'll have to figure out how to work around it.

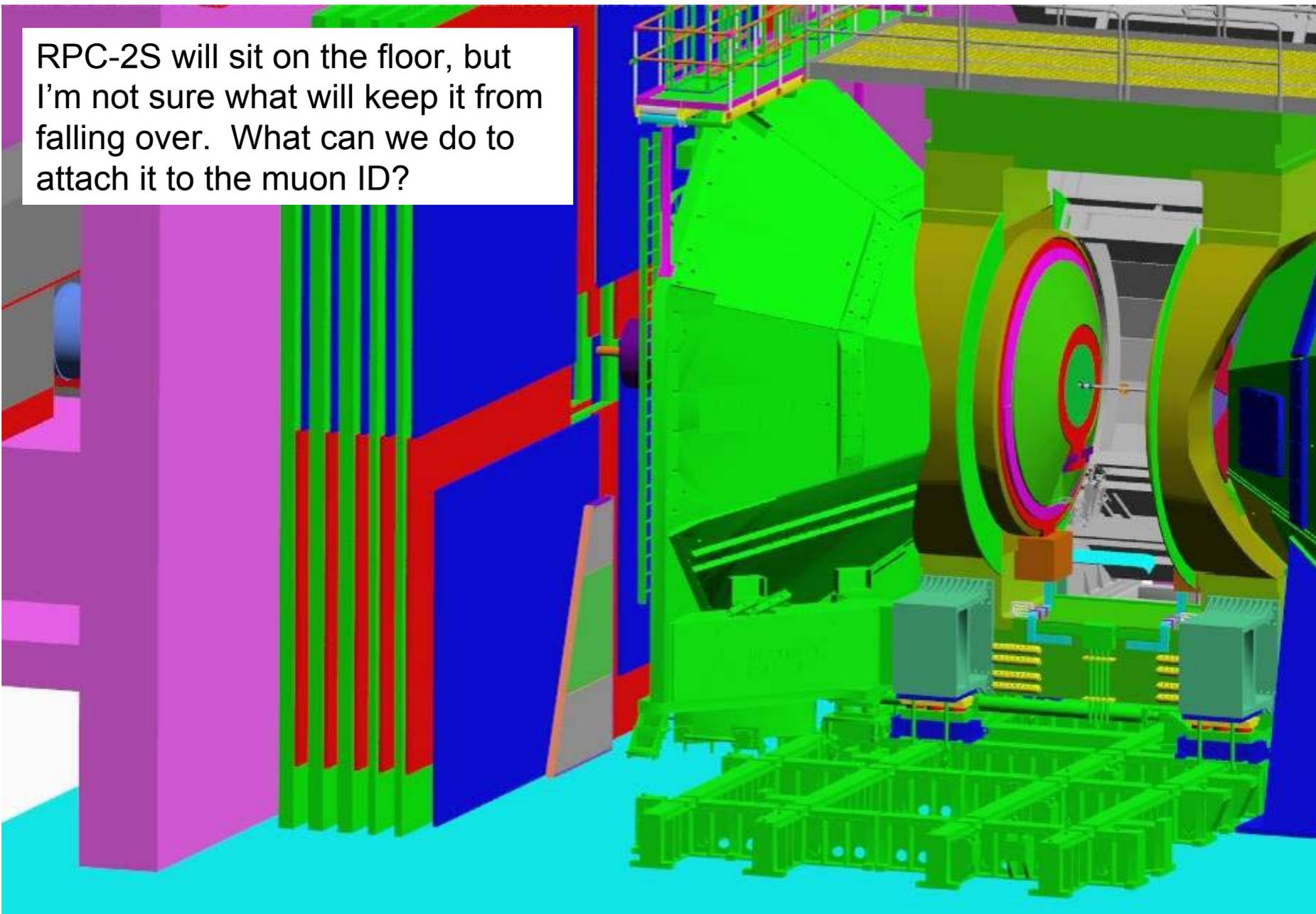


This is the wide flange beam I want to hang the half octant from in the gap.

The garage rails interfere with lowering the half-octant straight down into its position. That means I have to figure out how to translate it sideways in the gap. We will lower it down to the floor away from its final position and drag it under the magnet and rails. I'm not sure how to do this yet.



RPC-2S will sit on the floor, but I'm not sure what will keep it from falling over. What can we do to attach it to the muon ID?



# View looking down on the space where RPC-2S goes

Is there enough space to stand the RPC2 half-octant on the floor here?

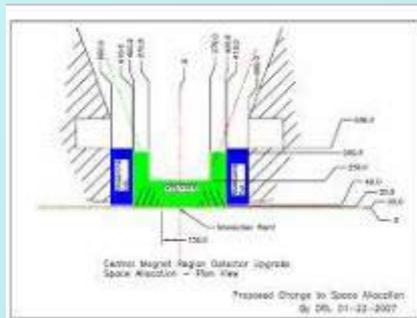
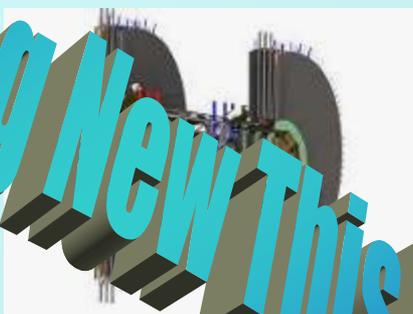
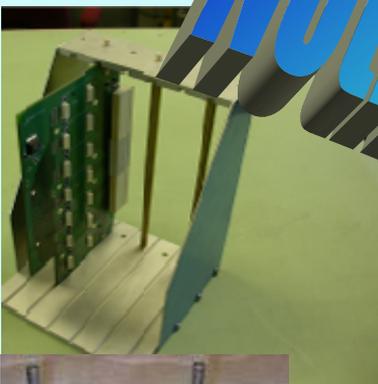
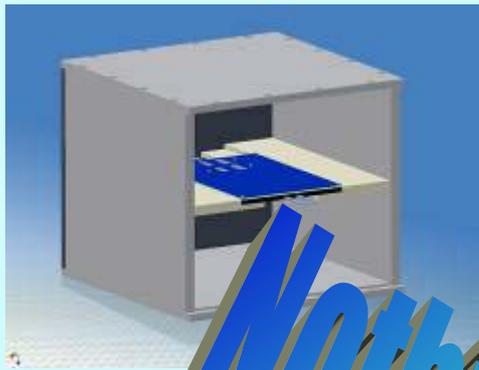


# RPC Design & Installation Challenges

PHENIX

TESTING - SUPPORT ROOM





# Other Work

- VTX, FVTX and NCC prototype support
  - Integration
  - Physical and Rack space
  - Infrastructure upgrades
- New Counting House Door
- VTX Prototype for run 8 ?

Nothing New This Week

- **Significance Category 4 Occurrence:**

Suspect rigging hardware found. Rigging hardware must have manufacturer's name or trademark, required by DOE and ASME

- New LOTO SBMS has been released incorporating appropriate OSHA, DOE and NFPA specs into our electrical safety requirements. C-A is currently updating C-A-OPM 2.3.6. Should not effect the way we do our work, but appropriate BNL training courses may be modified to comply. I'll let you know if and when and new training sessions are required.
- Shifts end this Friday remember to lock up if you are the last one out.

- 2008 Install stations 1& 2 of MuTr FEE upgrades (north), 1 octant Cu absorber (S), 1 half octants each RPC2/3 S, MMN sta. 2 scaffolding, MuTr Sta 1 N&S scaffolding, 1 octant of MuTrigger FEE upgrades (south, sta 1 & 2), MuTr N stn. 1 & 3 decaps, MuTrigger rack platforms (N&S), CM crane, remove/replace beampipe, infrastructure upgrades & repairs, misc. subsystem work, 1 RPC rack in South tunnel, MuTrgr FEE N & S racks
- 2009 Remove HBD & RXNP, scaffolding in MMS, MuTr S stn. 1 & 3 decaps, RPC2 N, RPC3 N, north Cu absorbers, partial VTX, iFVTX, MuTrgr S sta 1 & 2, MuTrgr S rack, 2 racks in N tunnel, infrastructure upgrades & repairs, misc. subsystem work
- 2010 Remainder of VTX barrel, partial FVTX, south Cu absorber completed, MuTrgr FEE stn. 3 S, any remaining MuTr decaps, infrastructure upgrades & repairs, misc. subsystem work
- 2011 RPC1 N&S, NCC N, remainder of FVTX, DC West upgrade/repair, remove absorbers, infrastructure upgrades & repairs, misc. subsystem work
- 2012 NCC S, upgrades contingency & wishlist, infrastructure upgrades & repairs, misc. subsystem work, TBD new and improved upgrades

*\* Years refer to the shutdown year and follow the run with the similar number (i.e. work in 2008 is to be done in the shutdown that follows run 8, and so on)*

Prototype C tests underway

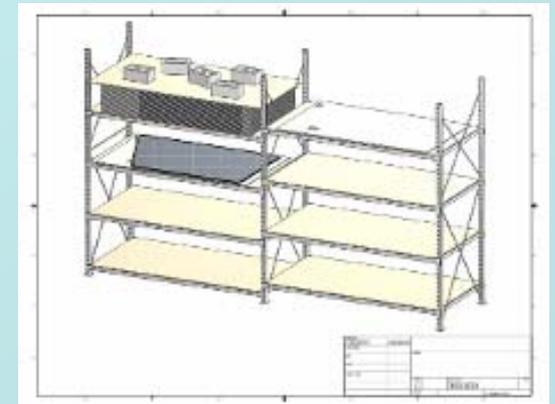
Prototype D in design/fabrication

Additional equipment needed:

transport table

$\frac{1}{2}$  octant/module/gap storage racks

$\frac{1}{2}$  octant handling and transport fixtures



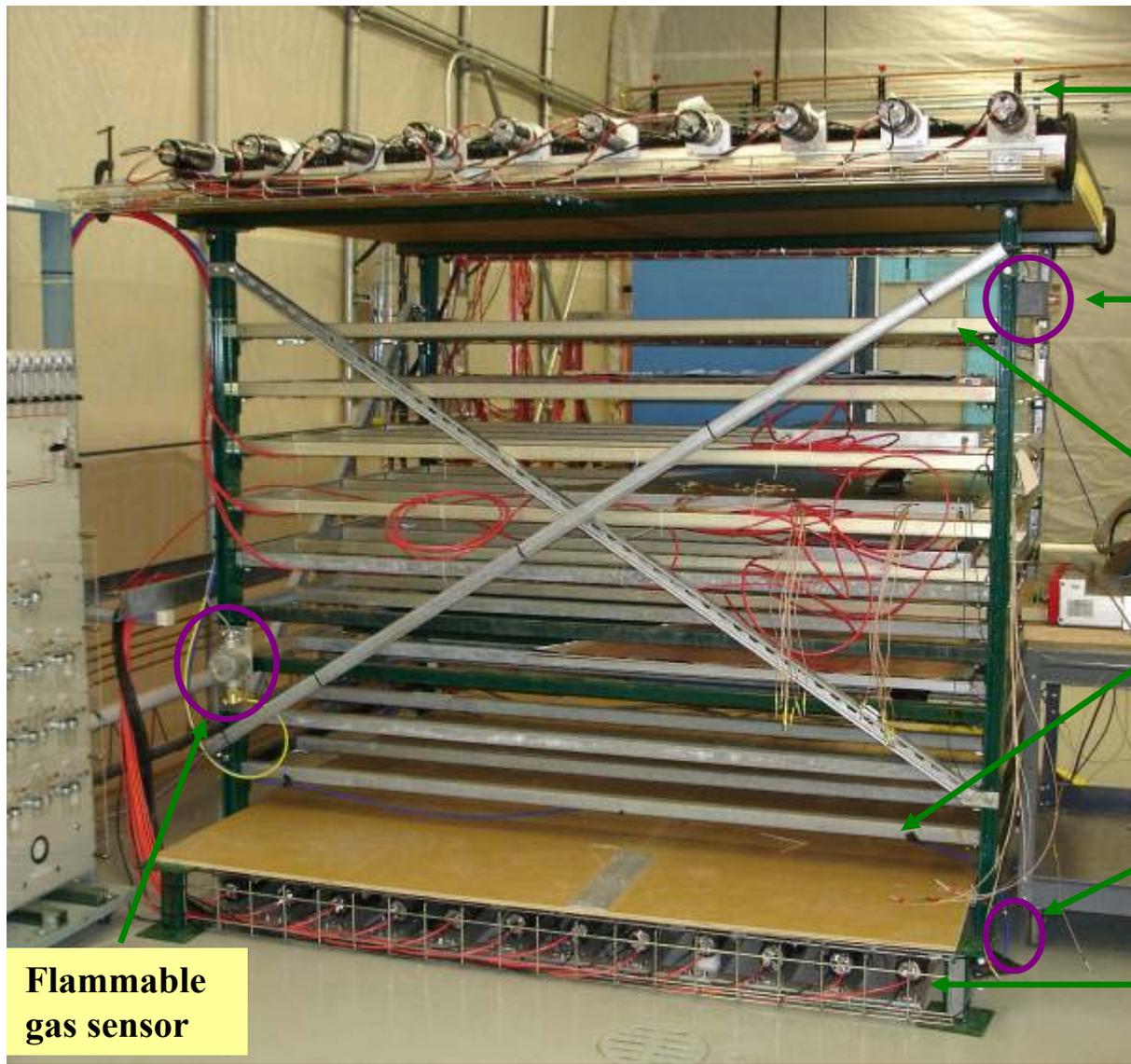
- 1. Cosmic ray test stand**
- 2. Gas system**
- 3. Electronics Racks**
- 4. RPC prototype**
- 5. Summary and Outlook**

Young Jin Kim

University of Illinois at Urbana-Champaign

For the Forward RPC Group

# Cosmic ray test stand



10 scintillators:  
readout both sides

Emergency Button

10 shelves for RPCs

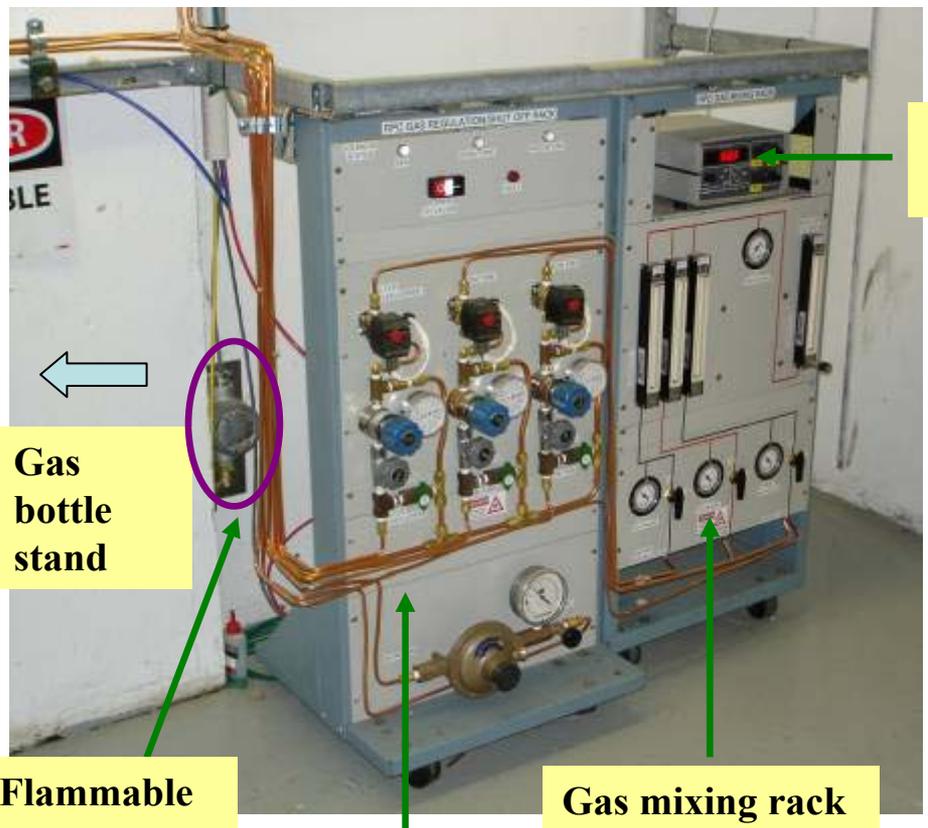
SF<sub>6</sub> gas sniffing tube

12 scintillators:  
readout both sides

Flammable  
gas sensor

We are going to measure 2d-efficiencies and position resolutions of each RPC<sub>38</sub> detector by cosmic rays.

# Gas system



Gas bottle stand

Flammable gas sensor

Gas regulation/shut off rack

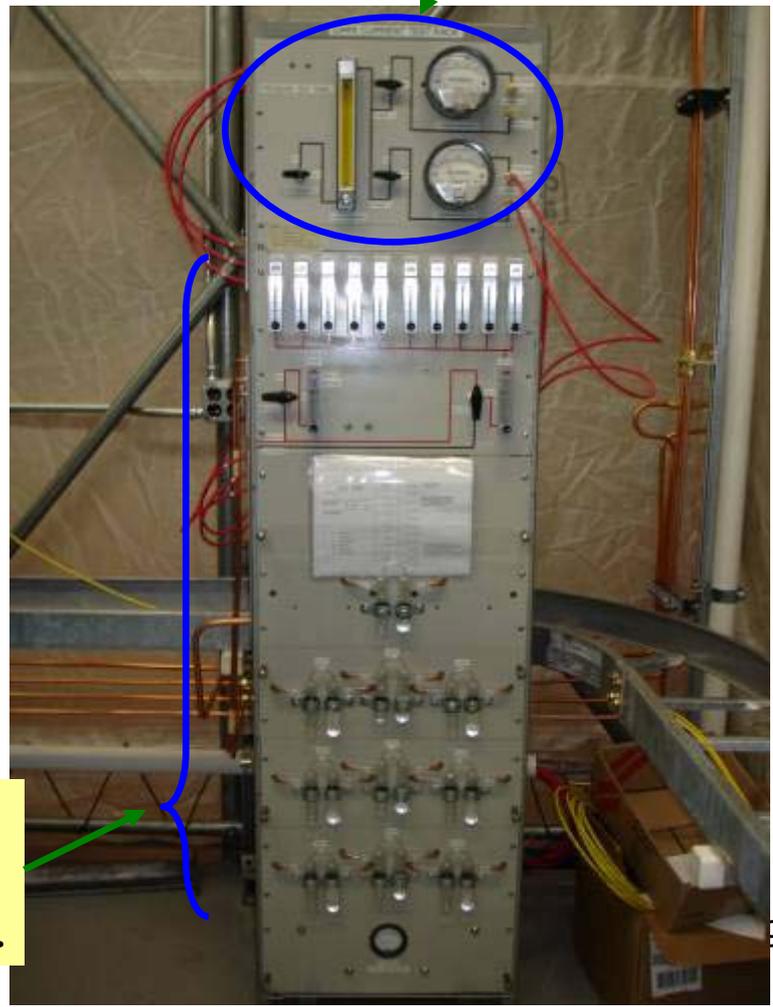
Gas mixing rack

Gas mixing control unit

RPC gap leakage/gap-pop test unit

Gas system at the RPC factory is running without any problem.

10 RPC gap gas distribution unit  
We have two of them.



# Electronic racks



**Two LeCroy H.V power supplies for scintillators  
One CAEN H.V power supply for RPC detector**



**Setting up trigger and readout electronics**

**(at the very end ~ 500 channels)**

# Safety system at the factory ready



**SF<sub>6</sub> and flammable gas alarm system  
(low level/high level alarm)**

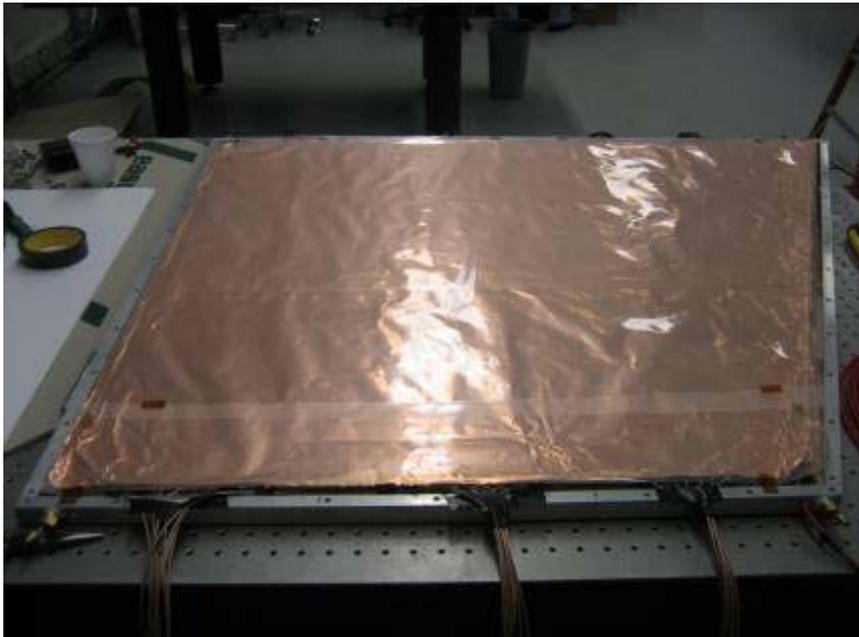
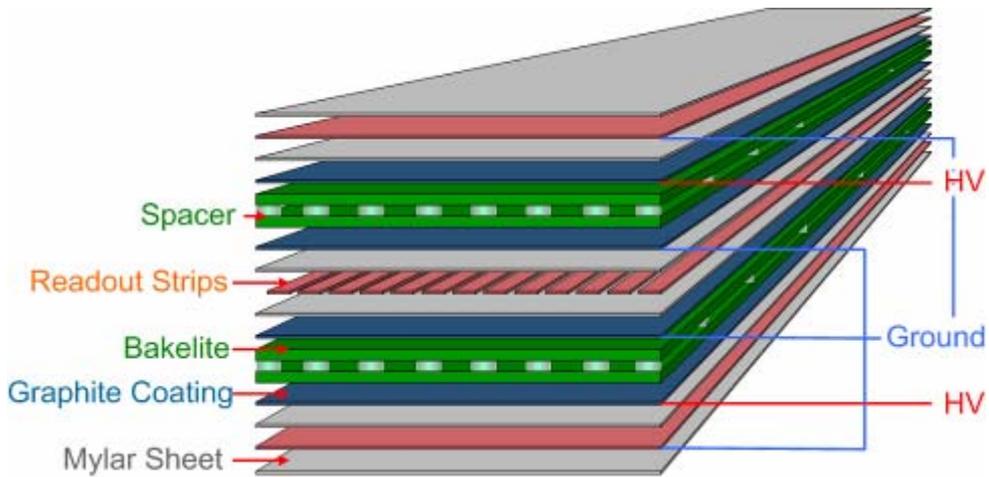
**Fire and smoke alarm system.**

**Two emergency buttons inside tent.**

**Gas and electric shutoff system.**



# RPC prototype C



# RPC prototype C test

GSU RPC chamber consist of linseed oil coated Korean RPC gaps

RPC prototype C

GSU RPC chamber consist of non oiled Korean RPC gaps

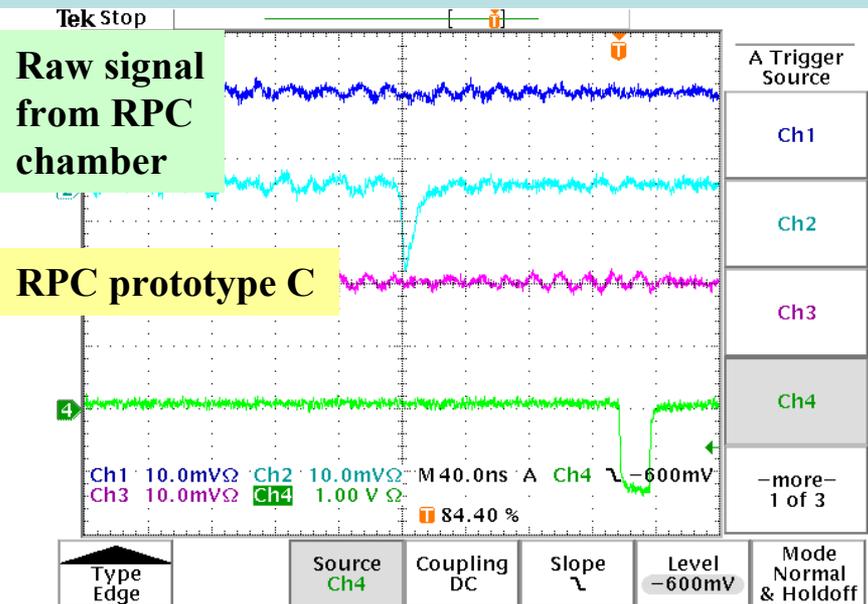
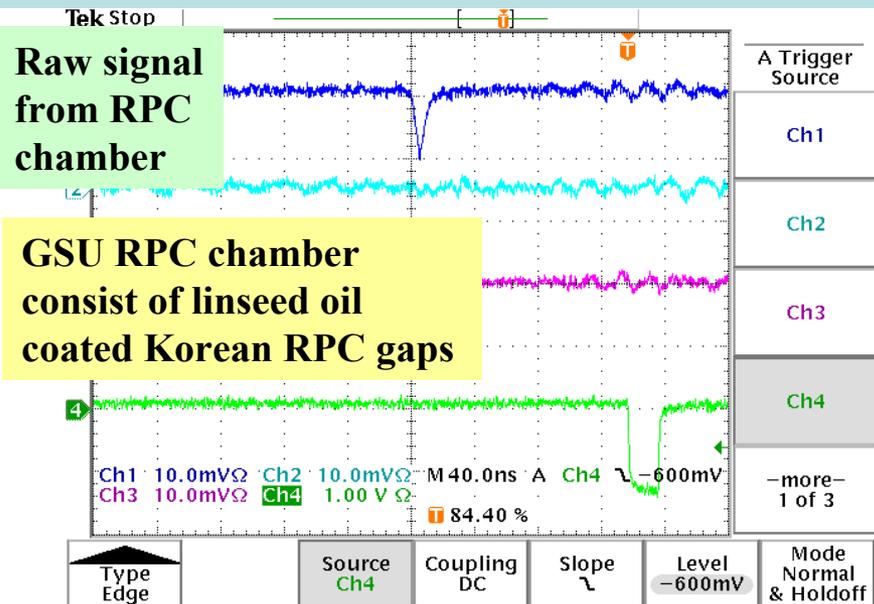


**Mixed gas has been circulated since March 3rd.**

**H.V has been applied up to 9.6 kV since March 4th.**

**Monitored dark currents are consistent with measured values at GSU and Korea University ( $< 0.1 \mu\text{A}$ ).**

# RPC prototype C test results

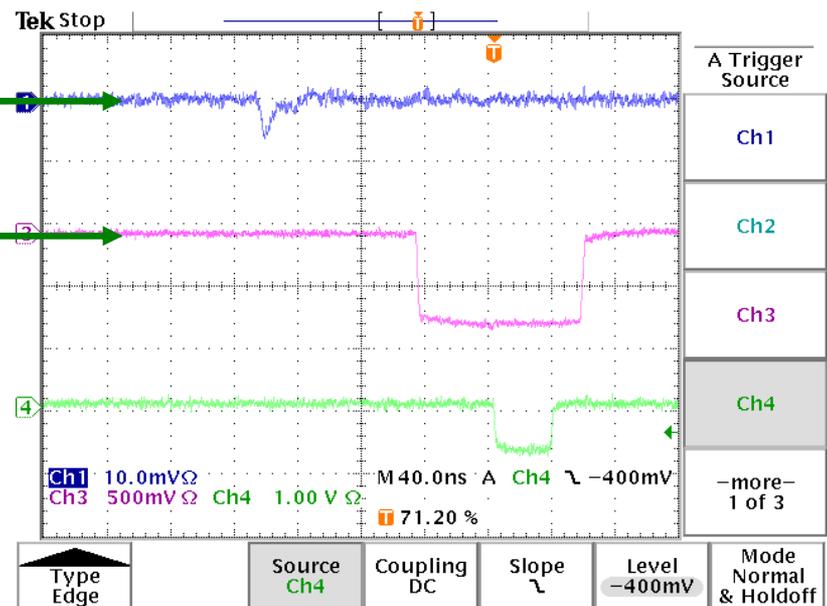


We have seen the signal from the first RPC prototype.

The chamber performance is getting better with time span under circulating mixed gas and applying moderate H.V.

Raw signal from RPC chamber

Logic signal after FEE



# Summary

## Summary

- **Cosmic ray test stand setup is finished.**
- **Gas system is working without any problem.**
- **We are setting up the cosmic ray trigger and readout electronics from RPC chambers.**
- **First RPC prototype C is being assembled.**
- **We have seen raw signal and logic signal from the prototype.**

## Outlook

**We are going to measure 2d-efficiencies and position resolutions of the prototype.**

**Conditioning of the RPC chamber is necessary.**

**Preparation of second prototype assembly will be started at next week (~ 2 weeks).**

**We have a lot of things to do, many measurements, and fun activities ahead.**

**We thank to all of you for a lot of help, support, and cooperation!!!**

*Happy**St. Paddy's Day!*

# Where To Find PHENIX Engineering Info

St Patrick's Day Trivia:

City with longest continuously running parade: Montreal, Quebec (176 years)

Largest crowds: New York (~2 million spectators)

Places where St. Paddy's Day is a public holiday:

Republic of Ireland, Newfoundland and Labrador in Canada,  
Isle of Montserrat

Some places where St. Paddy's is celebrated with parades:

New York (and most US Cities), Montreal, Copenhagen, Munich, Moscow,  
Buenos Aires, Rio de Janeiro, Sydney (Australia), Hong Kong, Cape Town,  
Yokohama, Amsterdam, Sibbo (Finland), London, Rocky Point,

No Parades in Paris, Rome, Beijing, Tel Aviv

It is tradition to pinch persons who don't wear green on Paddy's day.

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



[http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL\\_SSint-page.htm](http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL_SSint-page.htm)