ADRIAN SANCHEZ

Supervisor: Dr. Tiesheng Dai

ATLAS Experiment

Fall Intern
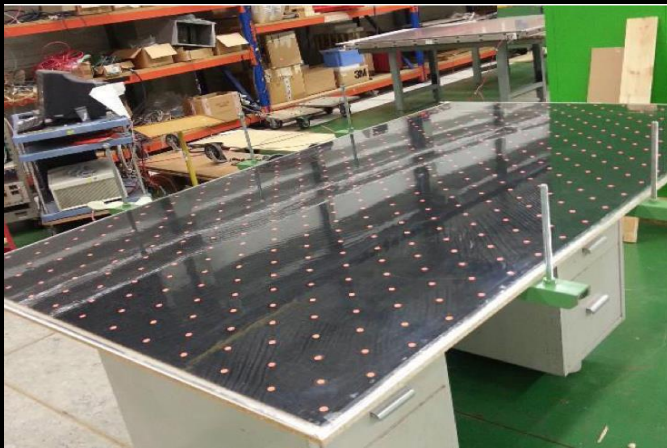
ATLAS EXPERIMENT

- Look for asymmetry between matter and anti-matter
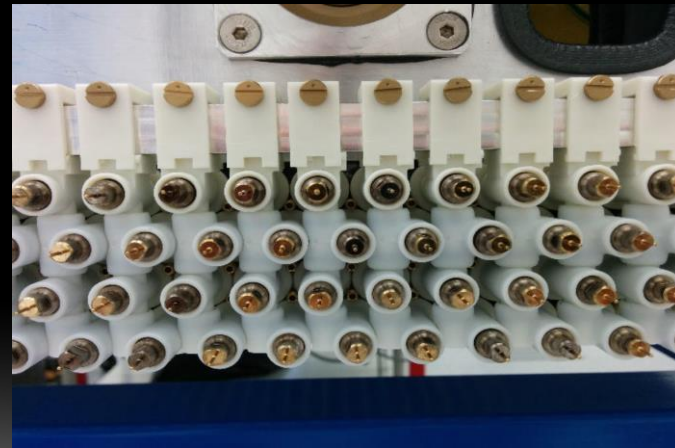
- Hope for micro black holes

HOW DO I PLAY A ROLE? WHAT'S MY GOAL?

- I am to install and commission the read out electronics for the RPCs in the BME and BOE .

- I am to commission the MDT Chambers in the same regions

- Goal is to install and commission what I have been assigned and possibly take on more projects
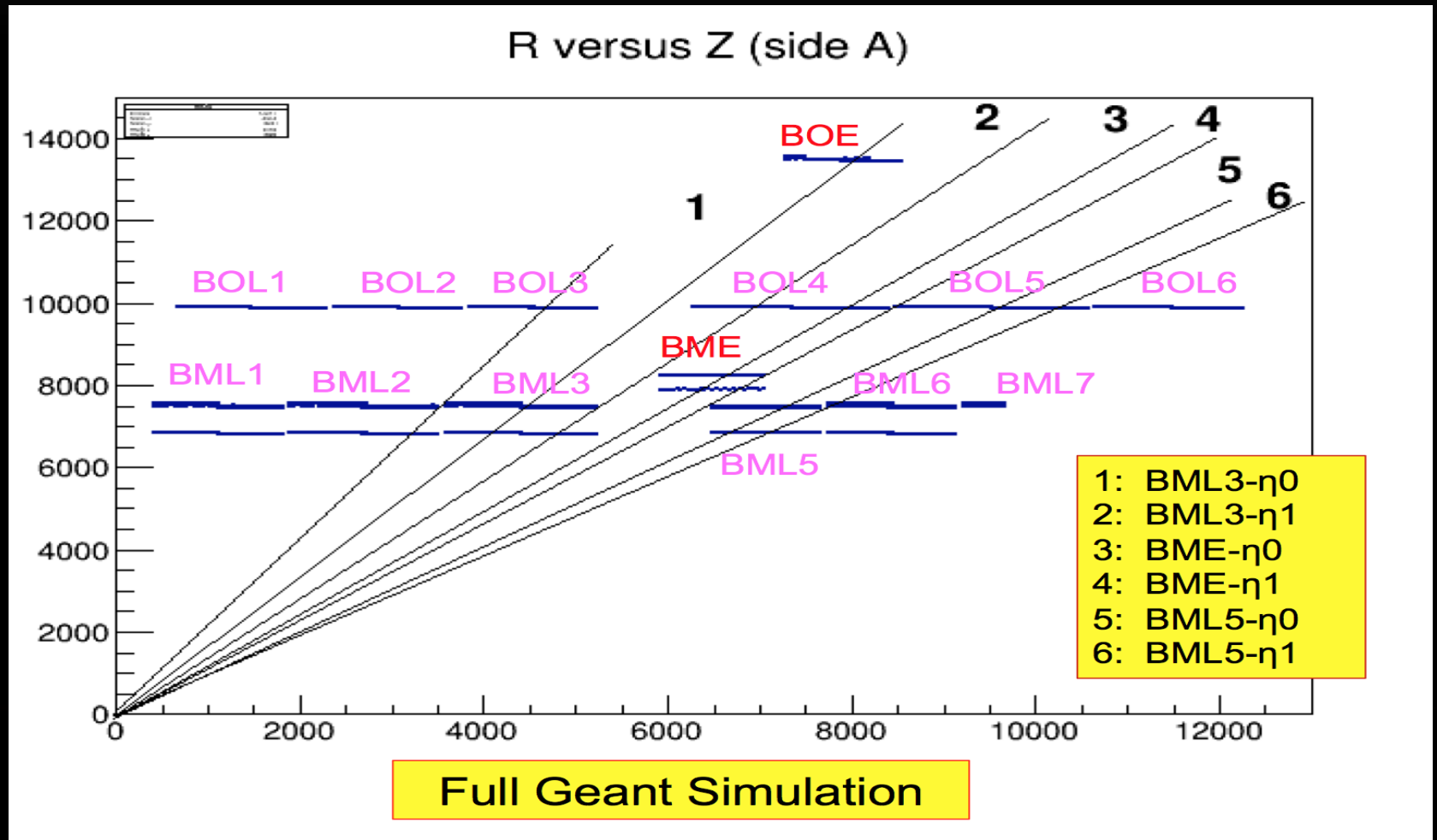
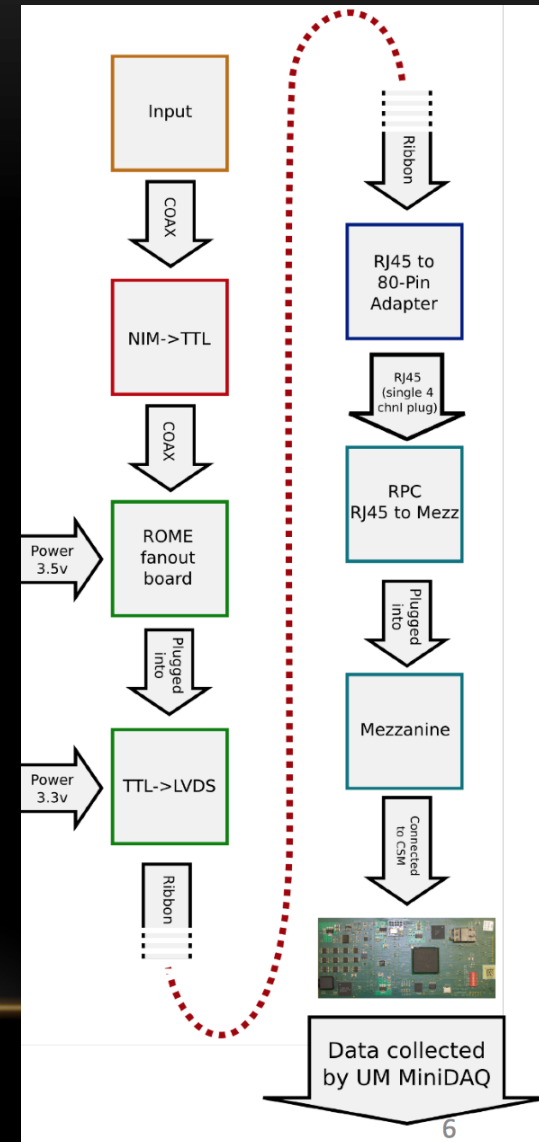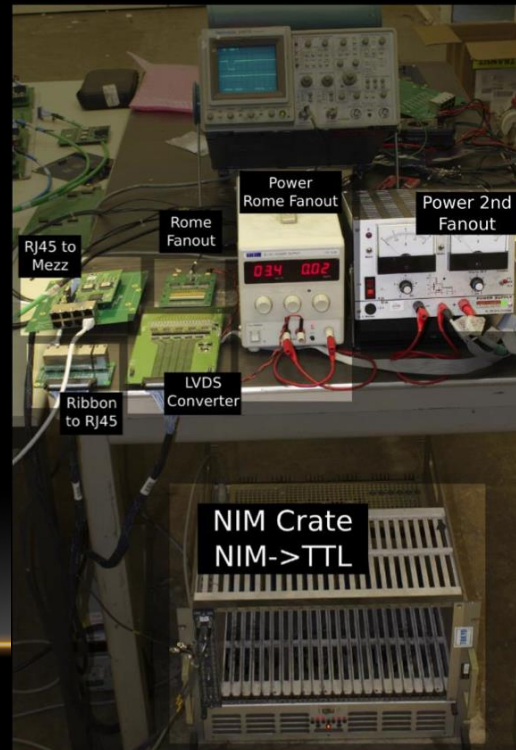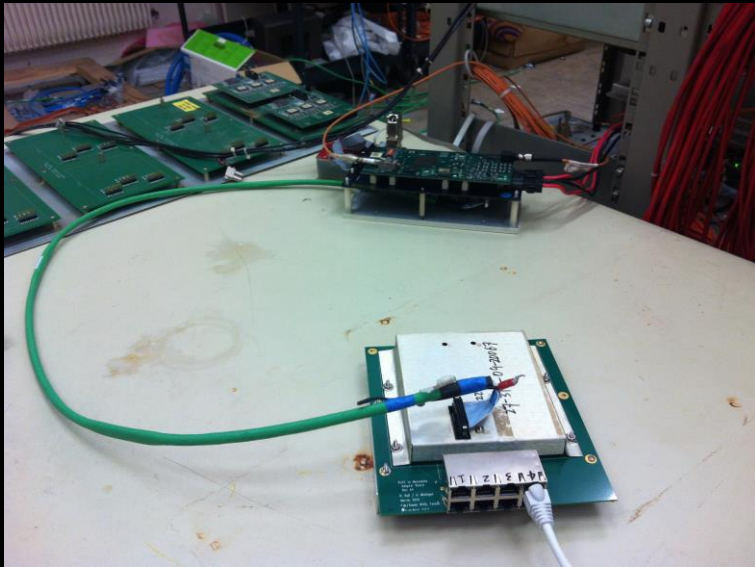Resistive Plate Chamber   Monitored Drift Tube

WHY THE BOE AND BME?

- Better coverage

R versus Z (side A)

Full Geant Simulation

1: BML3-$\eta 0$
2: BML3-$\eta 1$
3: BME-$\eta 0$
4: BME-$\eta 1$
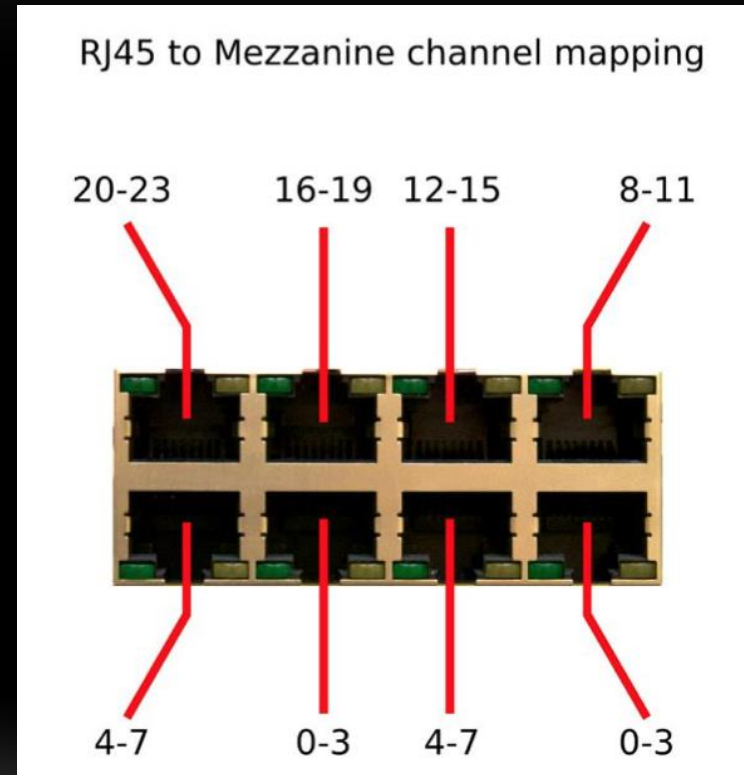5: BML5-$\eta 0$
6: BML5-$\eta 1$

MAPPING OUT CHANNELS: RJ45 TO MEZZANINE ADAPTER

- Send signal to each port of the RJ45 to Mezzanine Adapter

- Use UM MiniDaq

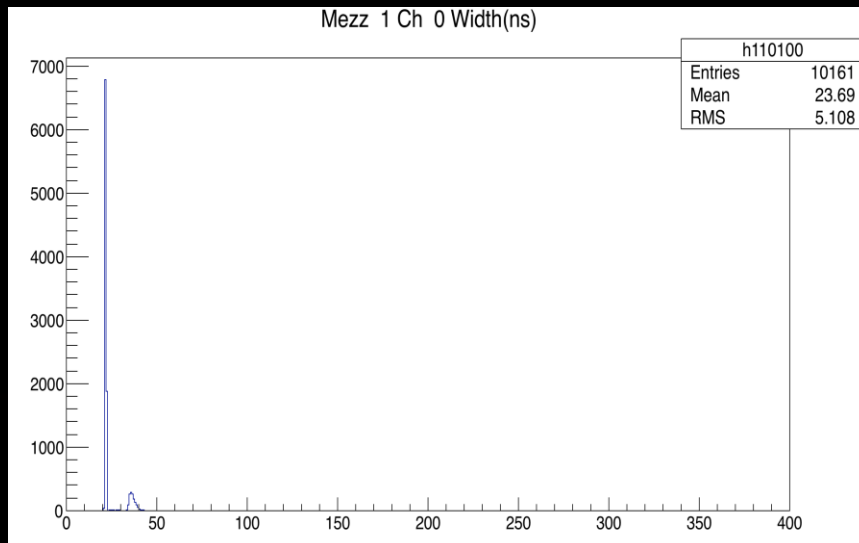# MAPPING OUT CHANNELS: RJ45 TO MEZZANINE ADAPTER

- Root code written to filter information

- Channels were mapped out

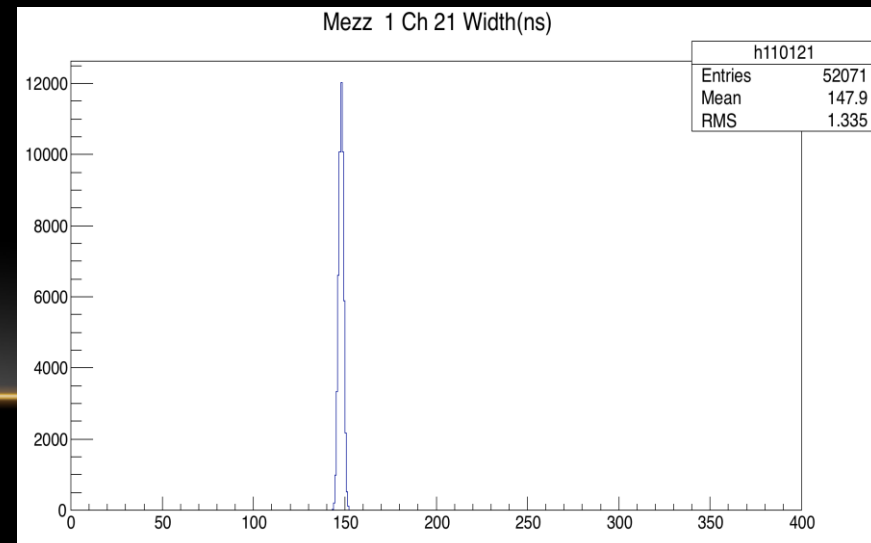- Problem encountered with signal reflection

RJ45 to Mezzanine channel mapping

SIGNAL REFLECTION

- Signal reflection prominent

- Reflection primarily in channels 0 and 8: ranges 10,000-25,000 entries for 50,000 events

  ➢ Reflection observed in 80/80 tests

- If signal is sent to channels 16-19; reflection is seen in channels 0,8,14,22
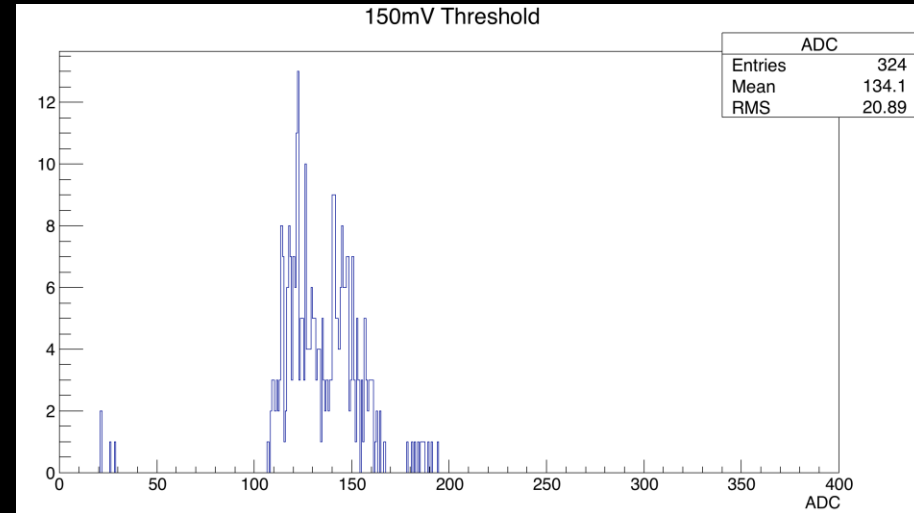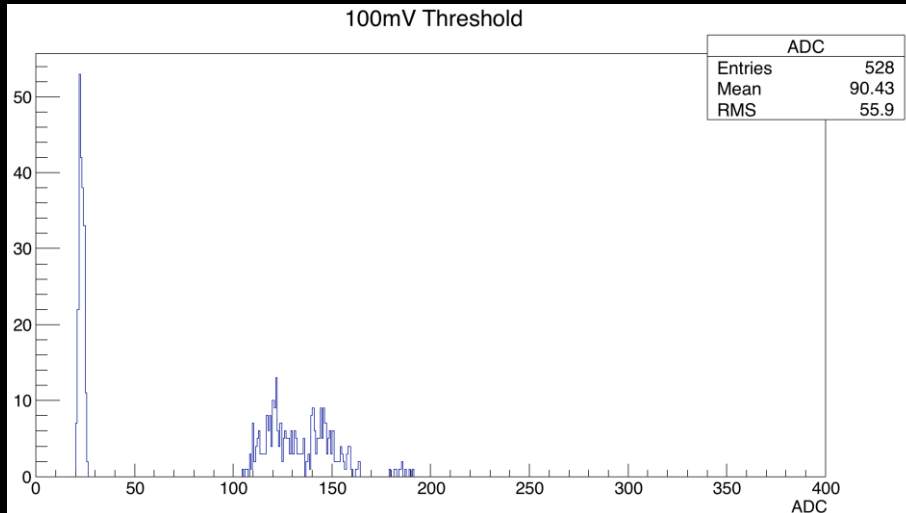
  ➢ Observed in 7/8 tests

Signal Reflected

Good Signal

SIGNAL REFLECTION REDUCTION

- Increase the ASD Chip Threshold from 100 mV to 150mV

  ➢ Increasing threshold lowers the signal reflection entries
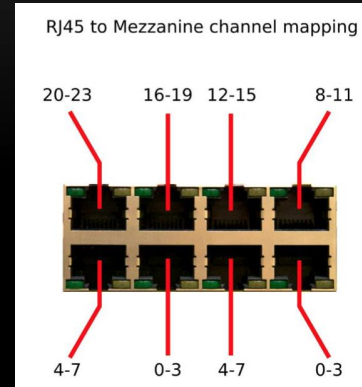
TDC SHIFT: OLD VS. NEW FIRMWARE

- New firmware to be implemented, want to know how TDC shift is affected

  ➢ Wrote root code to compare TDC shifts

  ➢ Found time shift in old firmware

  ➢ Only need new firmware to do tests

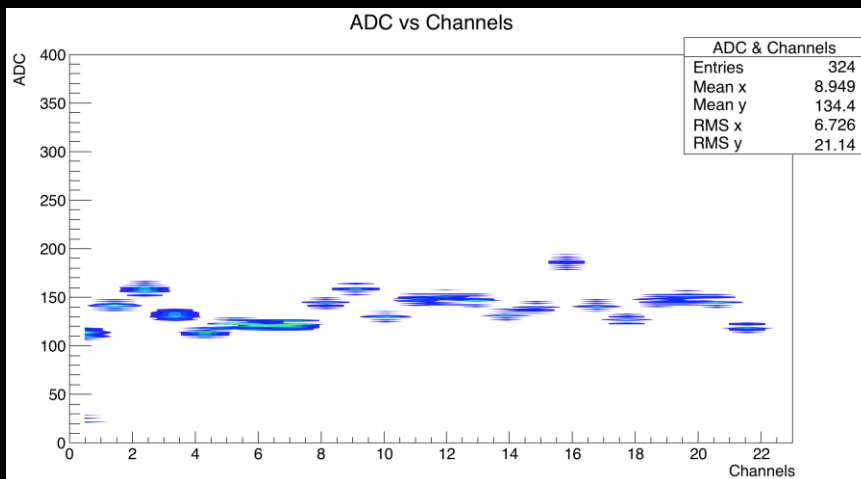Output text file of code

```
All TDC shifts are in nanoseconds

Mezzanine 0:  0.00120036
Mezzanine 1:  0.0319214
Mezzanine 2:  0.047526
Mezzanine 3:  0.00557454
Mezzanine 4:  0.00756836
Mezzanine 5:  0.00590006
Mezzanine 6:  0.0128377
Mezzanine 7:  0.0153605
Mezzanine 8:  0.0262248
Mezzanine 9:  0.0494995
Mezzanine 10: 0.00996908
Mezzanine 11: 0.0137329
Mezzanine 12: 0.0111084
Mezzanine 13: 0.0146077
Mezzanine 14: 0.128743
Mezzanine 15: 0.0143026
Mezzanine 16: 0.0175578
Mezzanine 17: 0.0244548
```
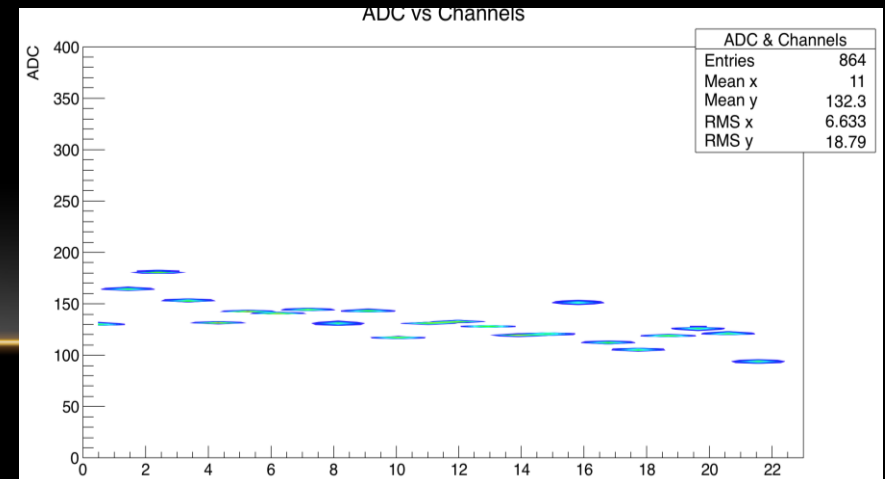
ADC AND MEZZANINE CHANNEL RELATIONSHIP

- Saw an inverse relationship between channel and ADC with all ports used

- Behavior is normal

  ➢ 32 Inputs and 24 outputs

  ➢ Some of the outputs receive two signals, instead of a one to one

  ➢ The ones which receive two signals are the lower channels

RJ45 to Mezzanine channel mapping
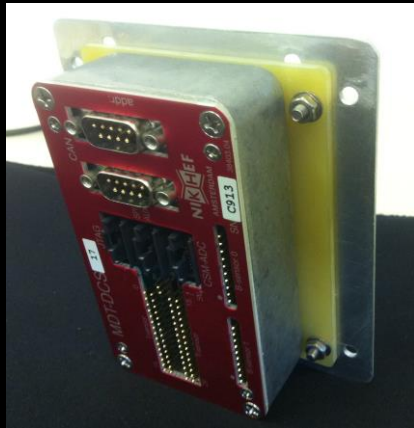
RJ45 to Mezzanine: 1 Port Used
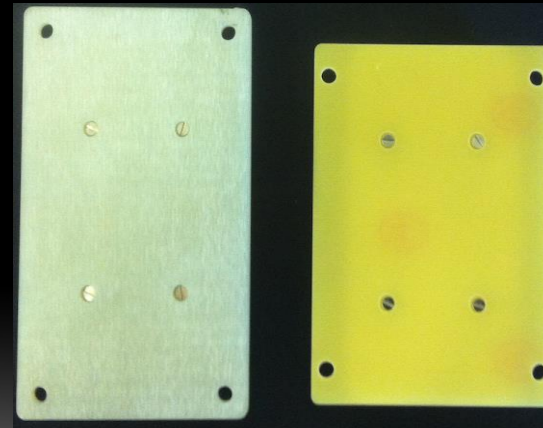

RJ45 to Mezzanine: All Port Used

MDM MOUNTING

- Two MDM mounting frames and only one fits BME Service Frame

- Solution: Making aluminum interface universal to all MDM frames

  ➢ Easy to machine

  ➢ Does not put the BME Service Frame at risk

MDM with Aluminum Interface

Two MDM Mounting Frames

INSTALLATION PROGRESS

- BME side A has MDM, CSM and CSM Motherboard and one Mezzanine Board mounted

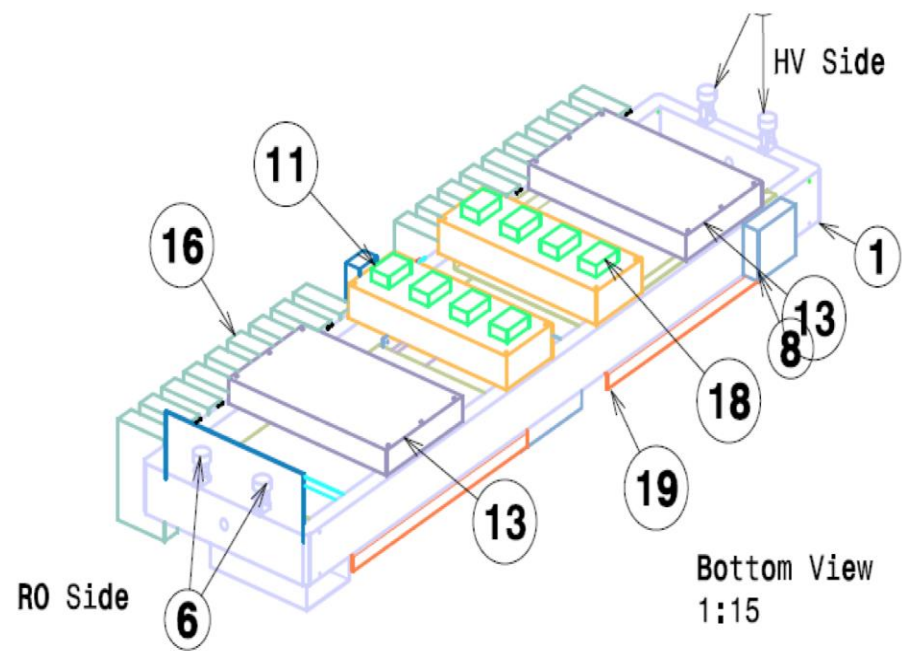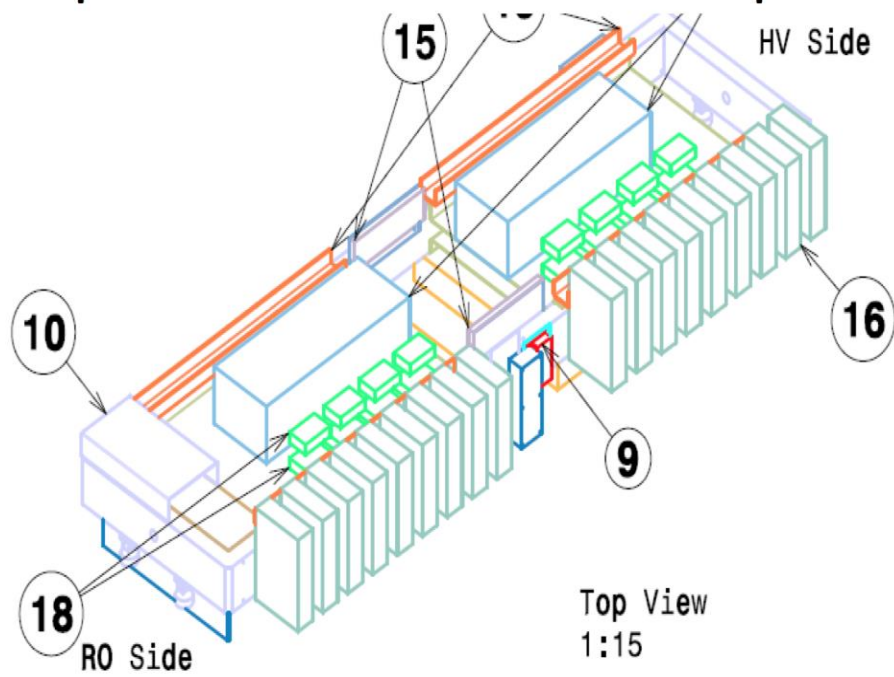- BME side C has MDM mounted

BME Side A   BME Side C

PREDICTIONS

- Commissioning is predicted to commence in November

What the BME will look like

SOCIAL EXPERIENCE

- Hiking in Bern
- Saw the Einstein Haus

SOCIAL EXPERIENCE

- Also saw a man dressed as a duck asking for money

WHAT CAN BE DONE TO HELP ME?

- Is it possible to take a course in particle physics while at CERN that is separate from our institutions, so we don't have to pay tuition

SIDE NOTE

- I helped move Big Wheel A