

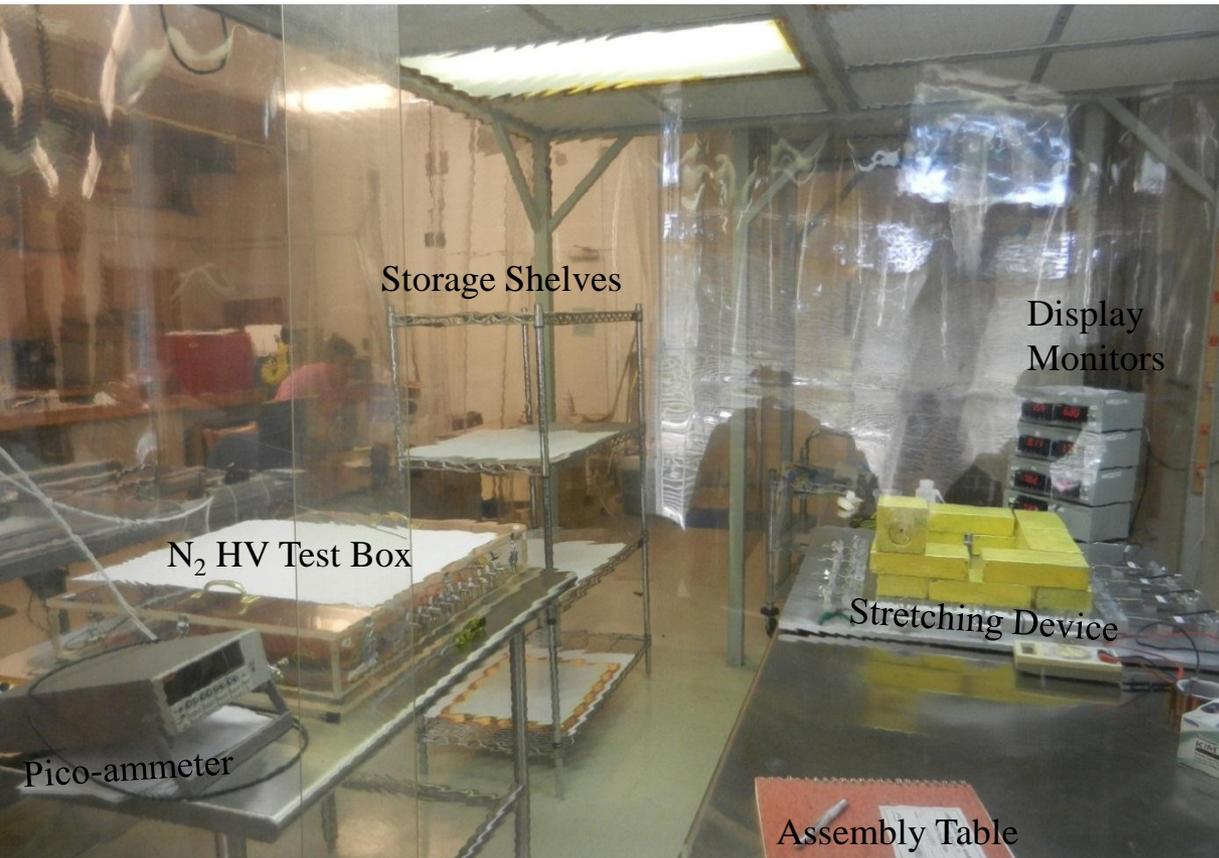
Update on GEM Activities at Uva

Kondo Gnanvo

- Construction of the SBS Prototype
- Test Data with APV25-SRS Electronics
- Preliminary Data with APV25-MPD Electronics
- Design for Large Trapezoid EIC/SoLID GEM prototype

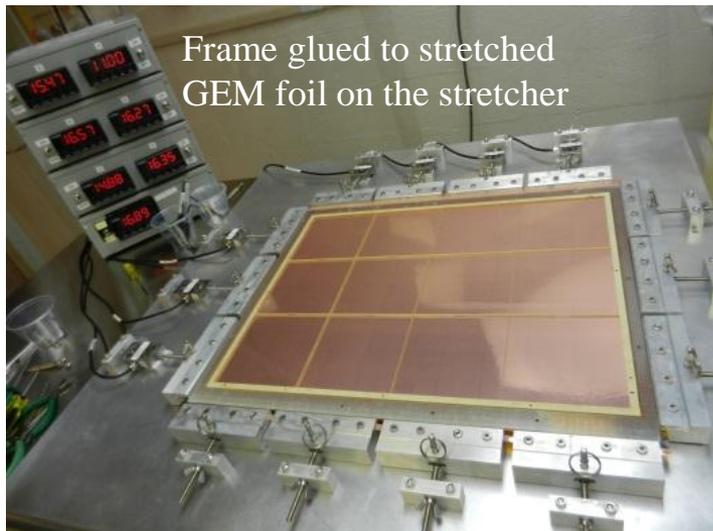
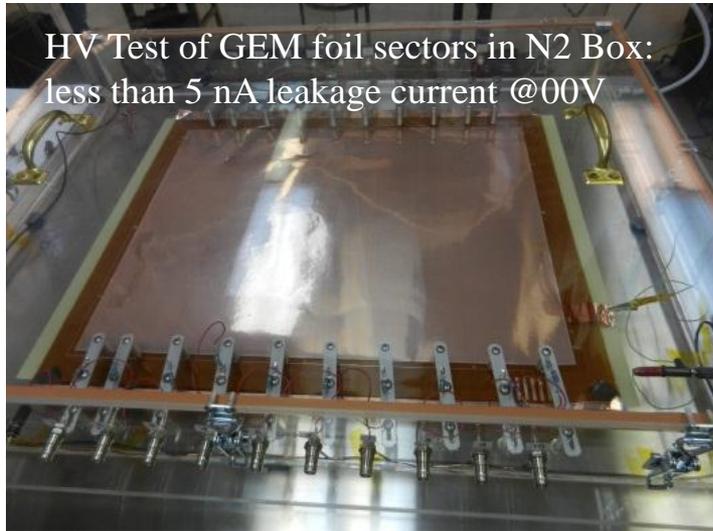
Construction of the SBS Prototype

- 4 m × 4 m Class 1000 clean room with GEM foil test box
- Mechanical stretching device designed @ UVa based on Benciveni's design (INFN Frascati)
- Large ultrasonic bath to clean GEM frames and stretcher parts
- GEM Test lab with APV25 electronics of about 5K channels



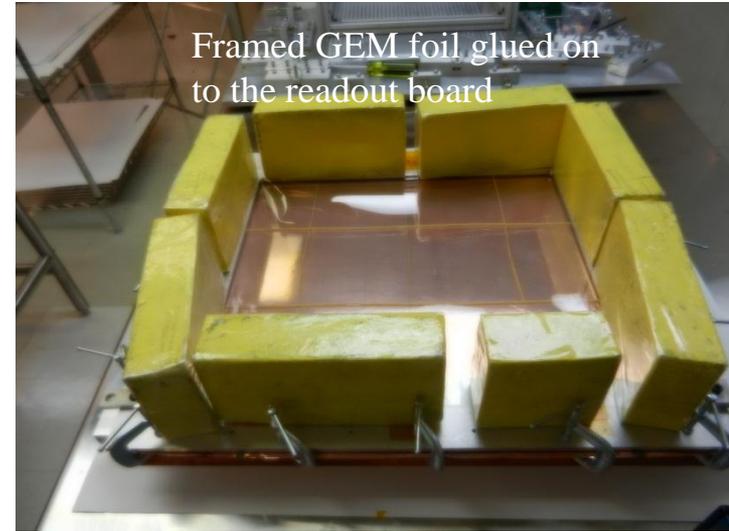
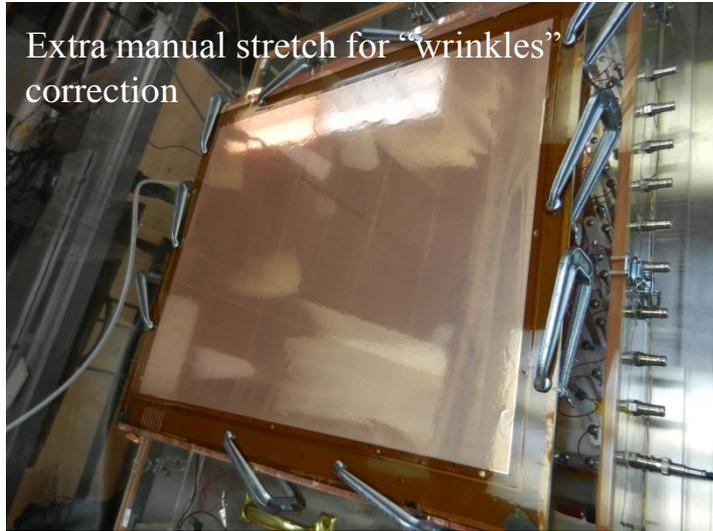
Construction of the SBS Prototype

Some steps during the assembly



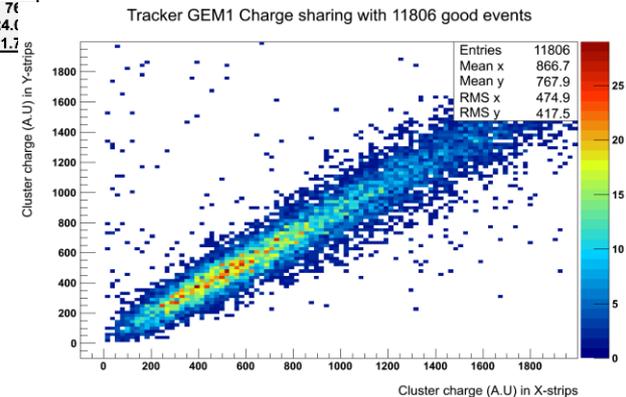
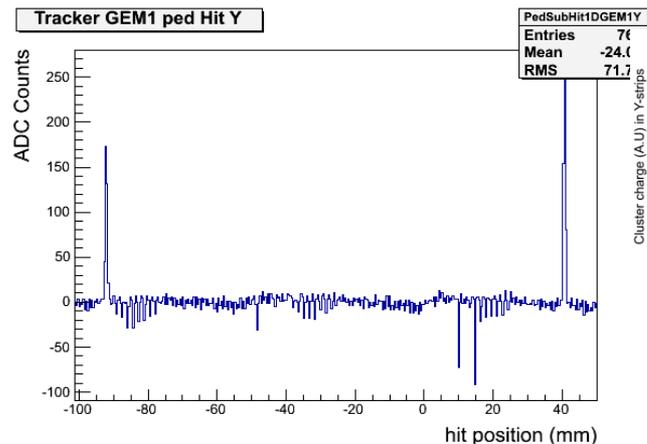
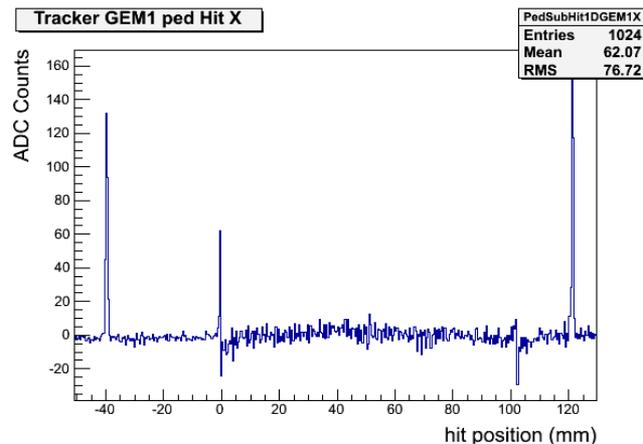
Construction of the SBS Prototype

Some steps during the assembly



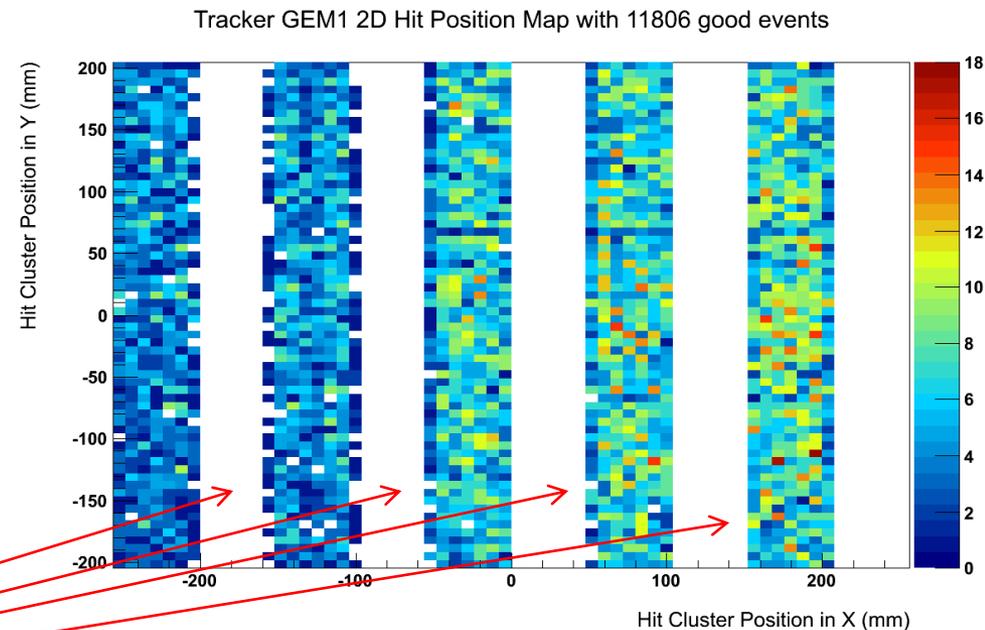
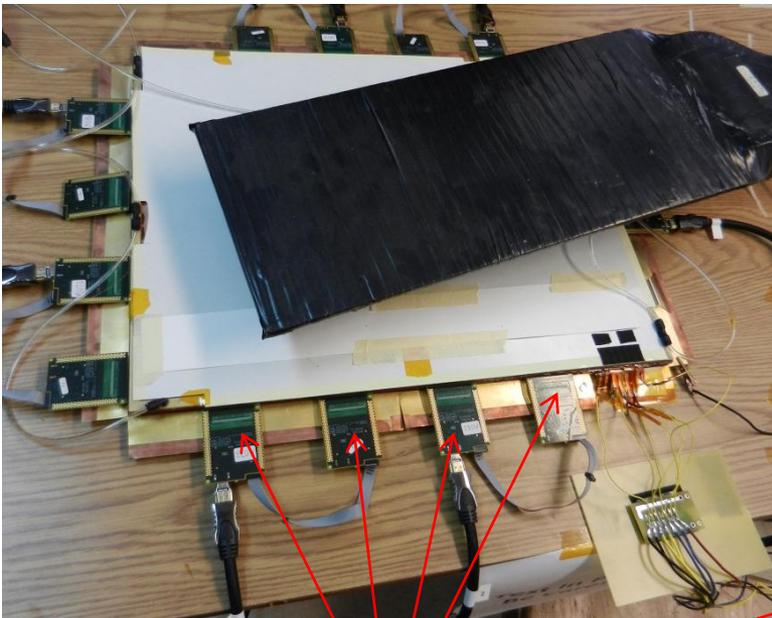
Test Data with APV25-SRS Electronics

- Final assembly in the lab (3-2-2-2 standard HV Divider and Panasonic connectors)
- Chamber tested in the lab with cosmic ray and SRS Electronics (@ 4.0 to 4.2 kV)
- Chamber overall response is pretty good, had a few sparks at the beginning
- Good X/Y charge sharing \rightarrow ratio = 0.88



Test Data with APV25-SRS Electronics

- We removed a few connectors because of bad soldering resulting on some very noisy sectors
- Rearrange the scintillator triggers to take a look at the 2D hit map under cosmic
- Overall good uniformity of the chamber → clearly seen along Y axis.
- The non uniformity along X-axis is most likely due to the trigger inefficiency → under investigation



These APV25 FE cards are removed

Preliminary Data with APV25-MPD Electronics

- Approve electronics for the Super BigBite Spectrometer in Hall A @ Jlab
- Developed by INFN Genoa (E. Cisbani, P. Musico)
- Based on VME64 architecture

APV25-MPD Electronics

(E. Cisbani, INFN Rome, Italy)

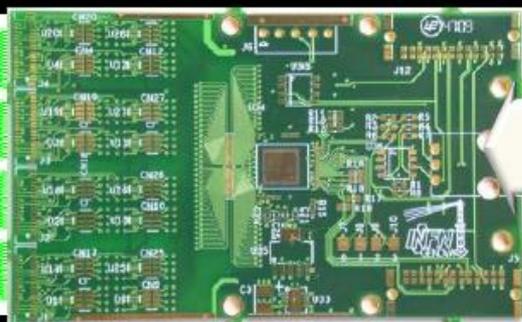
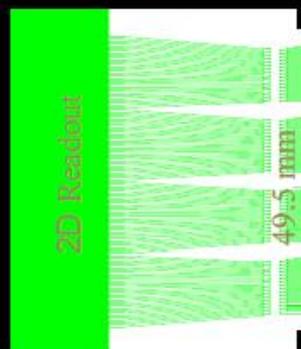
GEM readout



APV 25 Front End Card



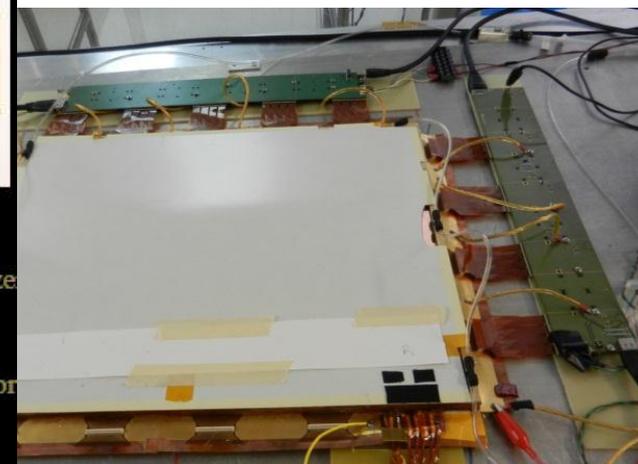
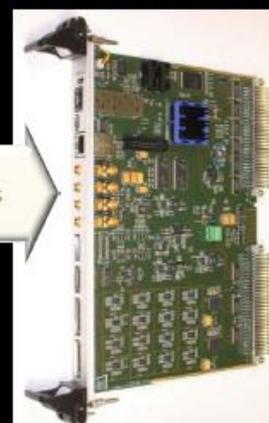
MPD = ADC + APV controller



75 mm

HDMI Cables

Passive backplane

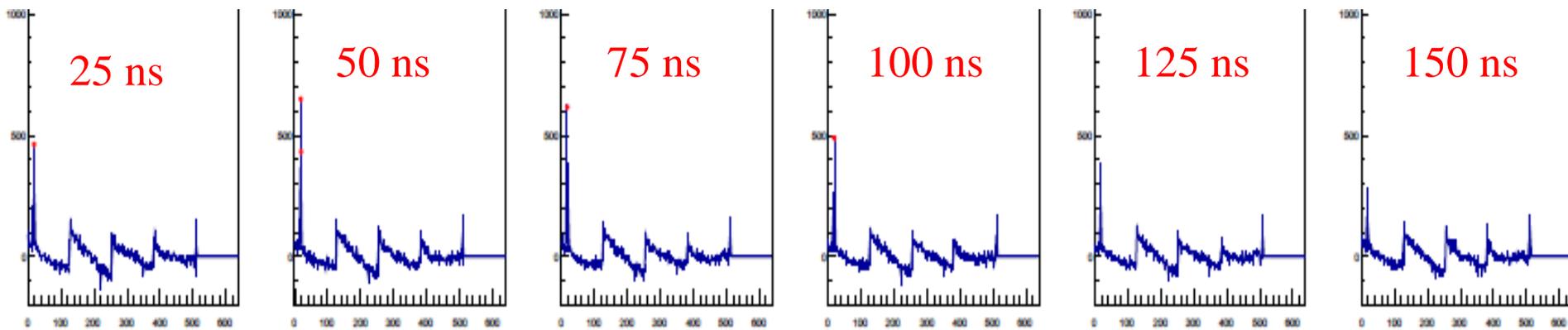


Main features:

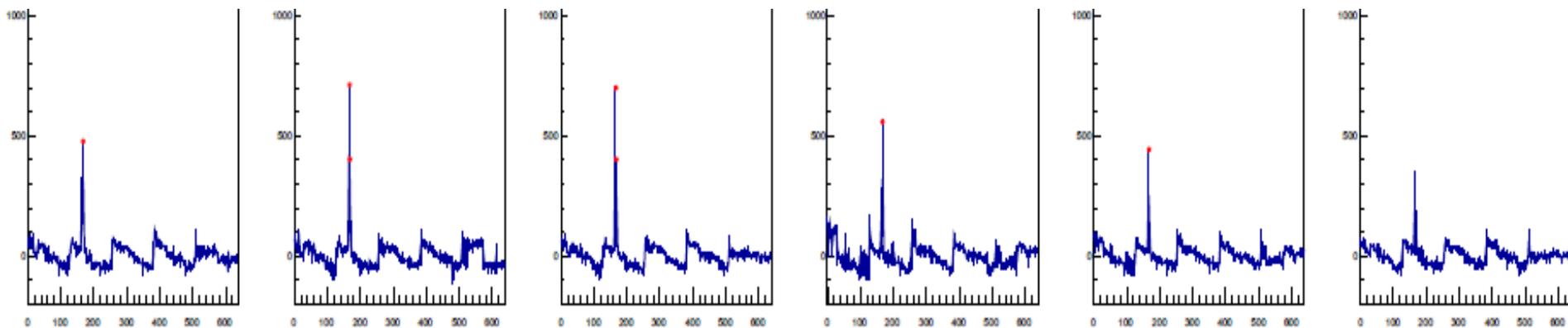
- 2 “active” components: Front-End Card and VME64x custom module (MPD=Multi Purpose Digitizer)
- HDMI Copper cables between front-end and VME
- Optional backplane acting as signal bus, electrical shielding, GND distributor and mechanical support
- Developed by INFN, manufactured by a commercial company

Preliminary Data with APV25-MPD Electronics

Along X-axis

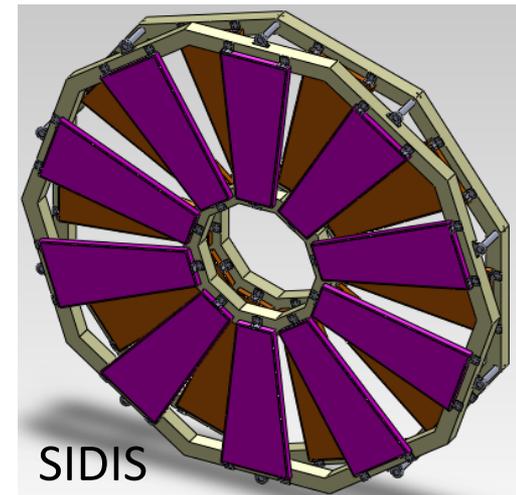
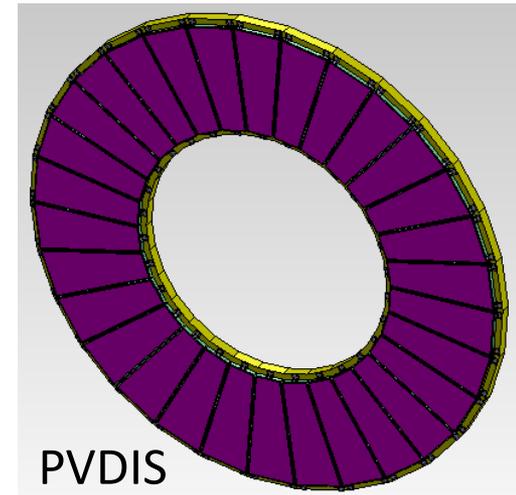
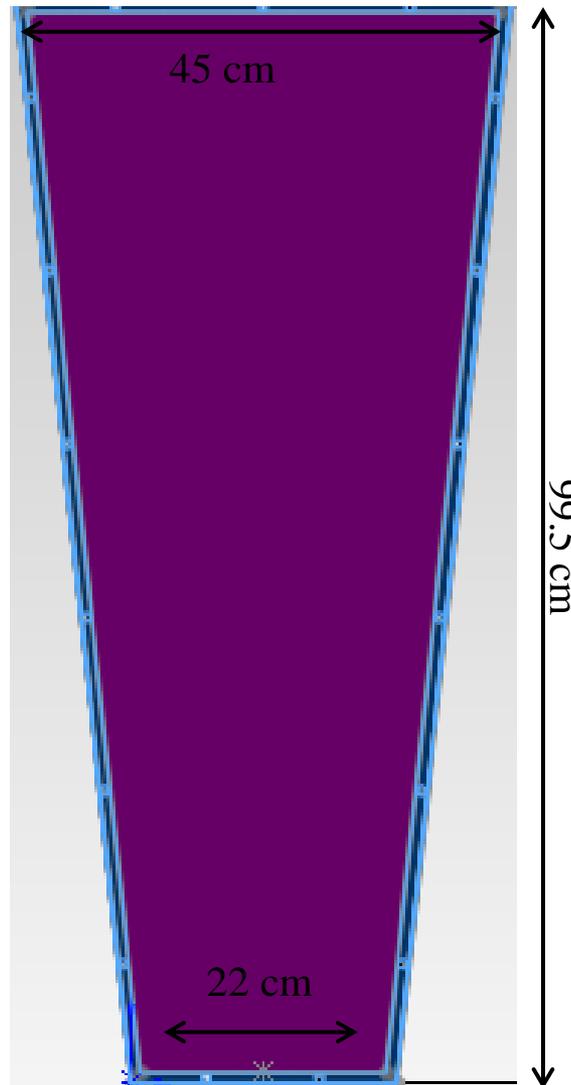


Along Y-axis

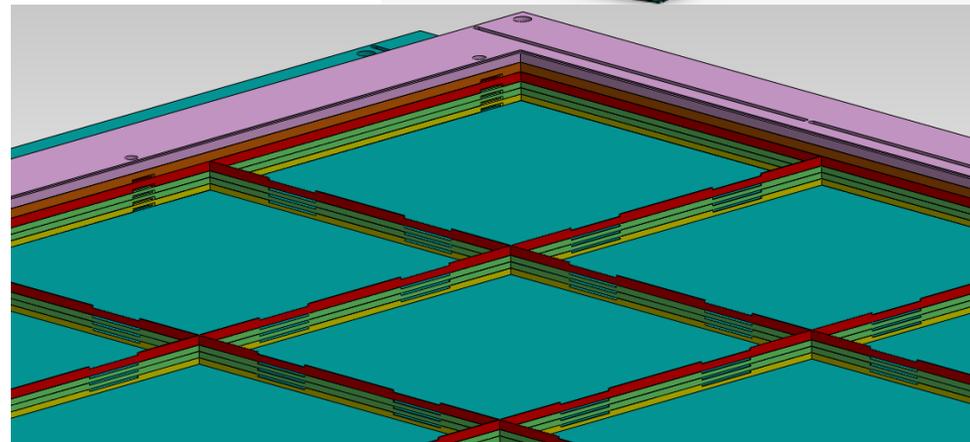
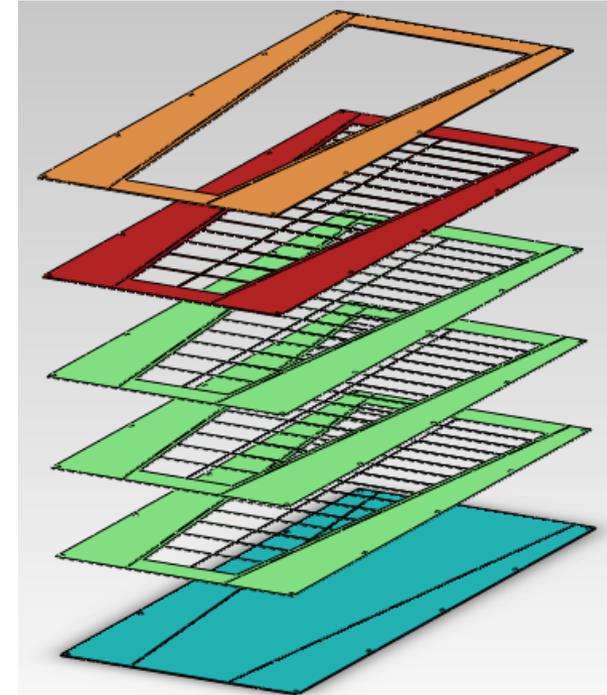
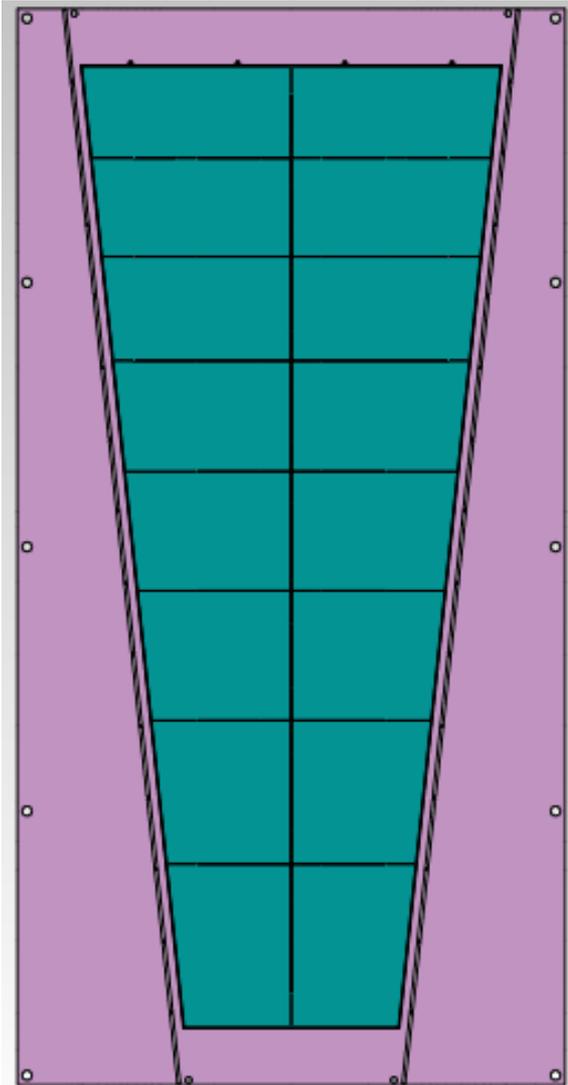


Design for Large GEM prototype for EIC/SoLID

- We start working on the design of a common design for the EIC and SoLID Large GEM module
- CMS GEM Design for high Eta Muon is the starting point.
- Seth Saher (UVa undergrad. student) is actively working on the design
- Collaboration with Marcus for the design of both the prototype built at Florida Tech and the one UVa



Design for Large GEM prototype for EIC/SoLID



To do list

- Right now, we are in the process to re-designing the SBS GEM modules
- Many of the ideas will be used for the EIC/SoLID GEM prototype like for example the gas flow system
- Soon we are going to start the construction for the mechanical stretcher for $100 \times 50 \text{ cm}^2$ active area GEM foil
- We will use the same stretcher for the new SBS GEM
- Start the design work for both EIC and SoLID tracker GEM readout board