

31/Aug/2020

# INFN GEM Status

E. Cisbani

SBS-weekly meeting

- There is negligible chance to come to JLab from Italy before end of 2020 → we are going/forced to return INFN travel funding for this year
- Testing and installation activities at JLab need to be carried on by local/US collaborators
- We will support remotely as much as possible (and carry on / finalize activities in Italy)

# GEM setup at JLab

Late Sep/2019

Nov/19: GEM can slide out for maintenance

Scintillators

GEM J4

GEM J3

GEM J0

GEM J2

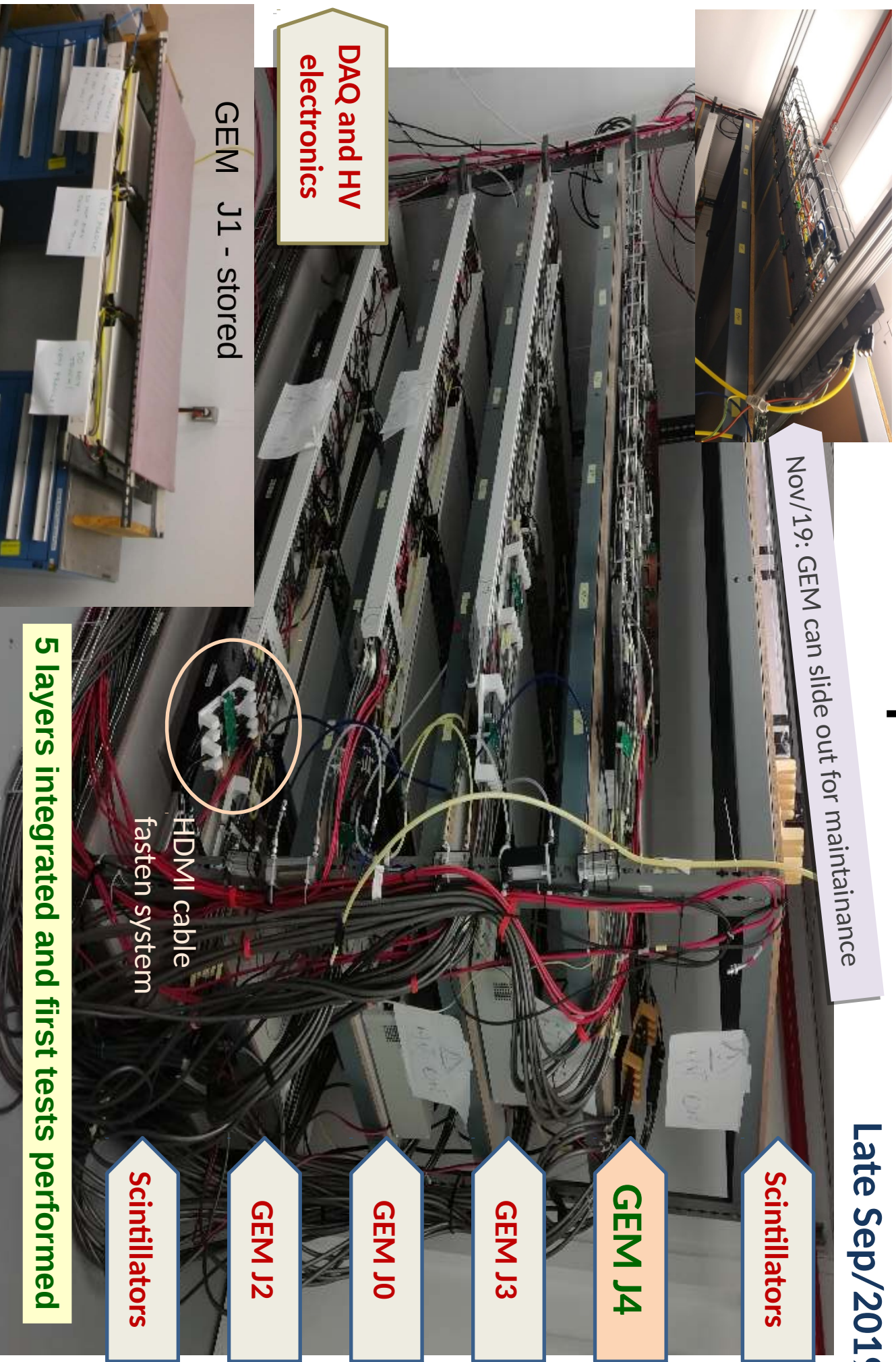
Scintillators

DAQ and HV electronics

GEM J1 - stored

HDMI cable  
fasten system

5 layers integrated and first tests performed



# Latest actions

- From 5<sup>th</sup> of Aug N<sub>2</sub> gas is flowing in 4 GEM layers (chambers) in the cosmic tower → thanks to Chuck!
- David Armstrong and Ezekiel Wertz agreed to support the GEM tracker activity; their support will be fundamental → thanks to Nilanga and Bogdan
  - **Ezekiel and David need to familiarize with the system;**
  - **They need permission to work in the Test Lab / GEM Room area!**
  - Ezekiel has tracked/refreshed the GEM BigBite frame design from Robin/Derek and is going to figure out the status of the new frame version
- Alexandre / Ben / Brian / Paolo are working on the DAQ and, among other, they are try to solve/mitigate issue in SSP-MPD optical link transfer speed

# High-level remaining tasks for BigBite installation

- Replace plastic cable trays (one chamber has the new metallic tray and can be used as reference)
- Fix annoying DAQ/Electronics issues that prevent to take continuous cosmic data (likely one MPD has some trouble)
- Rump HV up and do cosmic tests to check stability and final chamber characterization
- Finalization of GEM BigBite Frame and ancillary components
- Finalize procedure for moving GEM chambers to TED then inserting/removing in/from the BigBite Frame and build tools (hanging, sliding ...)

*Keep continuous gas flushing into the GEM chambers (Chuck support)*

# High-level remaining tasks for PR detector installation

(specific of the 2 INFN GEMs)

- Assemble the very last module in Italy and test it; (if successful we will have 4 candidate modules for last GEM layer)
- Select modules and integrate the 6th GEM layer
- Do some cosmic test (and/or by  $^{90}\text{Sr}$  radioactive source) ... need space in cosmic tower: some modules expected to be installed in BigBite
- Verify compatibility of GEM layer with holding PR detector frame
- Define installation procedure and test it (possibly use the same tools of the BigBite integration)

# GEM Activity in Italy till end 2020

- test of the last GEM foil in Catania - completed
- setup a drying oven (sort of) for ultrasound cleaning test - completed
- assemble an additional GEM module (we need to upgrade air conditioning in clean room and change some assembling procedure in accordance to new COVID – regulations), likely end of September
- test assembled module and likely send to JLab together with one or two modules we are trying to cure in Rome. They can be used to integrate the last layer (6<sup>th</sup>); likely end of October
- remote support the local-JLab activities (included electronics/DAQ)
- support UV chambers production
- ... continue software developments (microscopic simulation, firmware data suppression, Quantum Computing based alignment)



## Links to main GEM documentation

- GEM user manual (sort of): <https://docs.google.com/document/d/1QWbZPQZJ9SGWcWRKJDHXRwA0eFcie8kyNKTMDKzTs/edit?usp=sharing>
- Cosmic and installation test Run Log: <https://pandora.infn.it/public/cd5c37>
- Electronics MPD Firmware: [https://github.com/music0964/Fpga\\_4\\_Fiber](https://github.com/music0964/Fpga_4_Fiber)
- Also some entries in the SBS wiki: <https://hallaweb.jlab.org/dvcslog/SBS/>
- BigBite installation procedure (version 1): <https://pandora.infn.it/public/143c29>