

DSG-GEM Meeting Minutes

Date: April 22, 2021

Time: 11:00 – 12:00

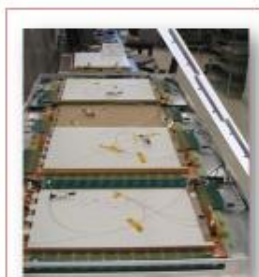
Attendees: Aaron Brown, Pablo Campero, George Jacobs, Narbe Kalantarian, Tyler Lemon, and Marc McMullen

1. Using GEM spectrometer technology to verify presence of tumors

1. The group is developing a computed tomography (CT) system for improved proton therapy for cancer treatment
2. The system is at the concept stage
 - Expected system testing of one to two years (needing gas system)
 - Expected commission in two years
 - Current beam characterization testing at Hampton University Proton Therapy Institute
 - Currently studying radiation to determine background and dose during operation of the proton beam
 - Documentation: [Development of High Resolution Radiotherapy Beam Characterization Technology Using Micro-pattern Gas Detection](#)
3. Primary benefit is better resolution (GEM 70 μ vs. Ion chamber 7 mm)

Proton Beam Characterization and Dosimetry

Gas Electron Multiplier Detectors
for Jefferson Lab Hall A Super
Bigbite Spectrometer



GEM Detector:

- UVA & INFN production

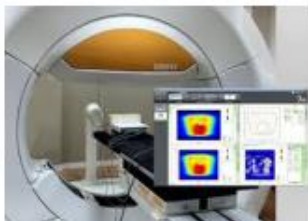
GEM Electronics:

- INFN (Italy) production
- UVA testing and QA

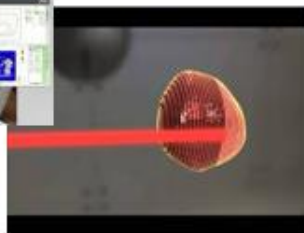
70 **micron**
resolution

7 **mm**
resolution

IBA MatriXX ion chamber array,
used for 2D beam characterization
in proton and X-ray radiation
therapy



Potentially excellent
tool for (new) pencil
beam scanning delivery
– requires fast data
acquisition



2. DSG-developed gas distribution system

Marc McMullen, George Jacobs, and Brian Eng

1. Posted DSG talks and notes on gas distribution and monitoring have been reviewed and suggested as recommended reading for staff/students involved in the project
2. System requirements have not been determined
3. Benefit of the DSG system above others is real-time monitoring
4. DSG requested information required to determine system specifications
 - Development location for the system: UVA (instrumentation) and Hampton University (testing)
 - Funding source/Account code contact: Cynthia Keppel
 - Gas type and mixture: currently premix Ar/CO₂ (70:30)
 - Detector volume: 10 x 10 cm²
 - Volume exchange: TBD
 - Channel count: TBD
 - Expected flow: TBD
 - Maximum pressure: TBD
5. DSG presented the WEDM monitoring page of the BigBite TEDF test setup