



# **GEM DAQ-Chamber Integration Test Stand for GE2/1 & ME0 at Florida Tech**

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# Motivation



- Provide an additional test bed for GEM chamber/DAQ integration that is located in the US
- Convenient for US people to work on, e.g.
  - Grounding & noise studies
  - Performance studies under high-rate radiation (X-rays)
- Florida Tech has a GE1/1 chamber production and commissioning site (for QC1-5); expertise will allow us to build a GE2/1 module or ME0 chamber prototype in situ for electronics integration testing
- Florida Tech to pivot from GEM chamber R&D to GEM electronics/DAQ R&D for GE2/1 & ME0 and synch with overall USCMS Phase 2 GEM efforts



# Approach



- **For starters, set up a complete GEM DAQ system for GE1/1 (“beg, borrow, and steal” so far)**
  - Begin with old partially instrumented long GEB and a few VFAT2’s; set up and learn GEM-DAQ
  - Attempt to integrate with existing GE1/1-V chamber
  - If successful, take data with X-rays at high rate
  - Compare VFAT2 performance with APV25 performance
- **Next, upgrade to state-of-the-art GEM DAQ**
  - Either VFAT2/OHv2B or VFAT3/OHv3, depending on what’s state-of-the-art when we are ready for this step
  - Integrate with a GE1/1 production chamber; we expect to produce our first chambers in April ‘17
- **Finally, switch to GE2/1 & ME0 integration work**



# Status



- Hardware procurement
  - **The following items are in hand at Fl. Tech:**
    - $\mu$ TCA crate (Schroff)
    - 2 NAT power modules for crate
    - - 48V DC power supply (powerone Aspiro 2U unit, 4.8kW)
    - 1 GLIB
    - 5 VFAT2
  - **Items to be taken from TAMU to Fl. Tech this week:**
    - Partial long GEB (can be instrumented with up to 4 VFATs)
    - OHv2a with SFPs
  - **Items on order or to be ordered soon:**
    - NAT  $\mu$ TCA carrier hub (MCH)
    - 4 LV linear power supplies (0-30V, 5A)
    - Optical fibers
- Software: nothing yet; will bug you when h/w ready for it

Follows  
setup at  
CERN TIF



# Plan & Schedule



- GE1/1 chamber material will not arrive at production sites until end of March '17
- Use this schedule gap to set up initial GEM DAQ test stand
- Upgrade when chamber production schedule allows
- Make test stand available to US collaborators

Suggestion for additional potential use cases of this test stand are welcome!

Offers of 2017+ project funding also welcome!



**Thank you!**



# BACKUP