



# Update on the BigBite Gas Ring Imaging Cherenkov (GRINCH) Detector for BigBite

SBS Meeting, 12-Sept-2018

October SBS Review Format

- Detector: BigBite Gas Cherenkov for  $10^{-2}$   $\pi/e$  separation
  - 510 array of 1" PMTs
  - Timing clusters using VETROC
  - $C_4F_{10}$  gas at 1 atm; pion threshold 2.7 GeV/c
    - Simulation shows marginal performance with  $CO_2$
    - SHMS Cherenkovs 2x below simulation, not understood
    - B. Sawatsky "You would be insane not to use heavy gas."

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# Current Status



- Mechanical assembly complete
- Installed in BigBite detector stack, TED building
- Gas leak around door; work in progress
- HV and signal patch cables installed on BigBite
- All DAQ electronics in portable rack, being assembled for testing
- HV system fully functioning
- All cables in-hand
- 50% of long cables and repeaters installed between BigBite and rack
- Software development in progress



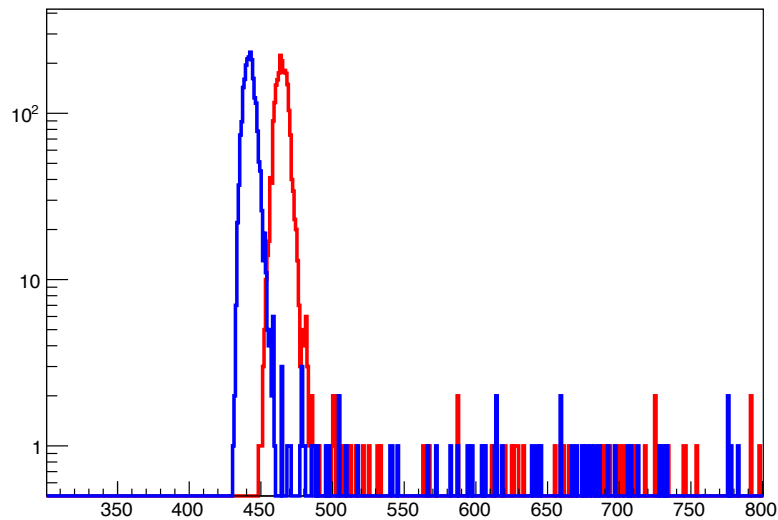


# DAQ results-LED w/prototype

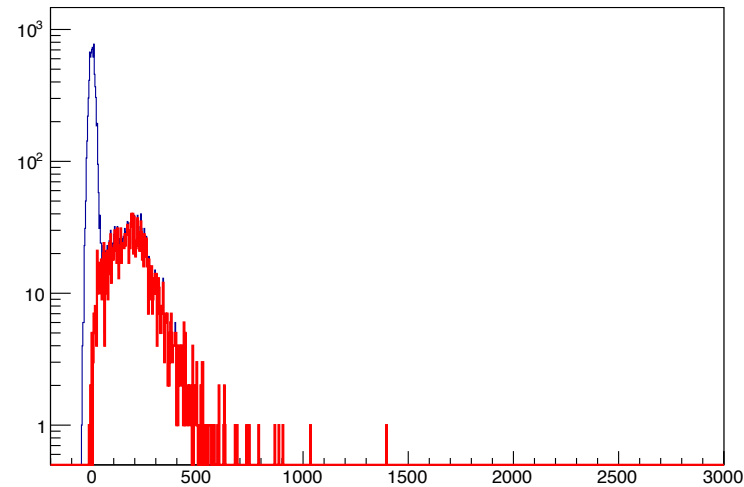
C. Ayerbe-Gayoso, E. McClellan



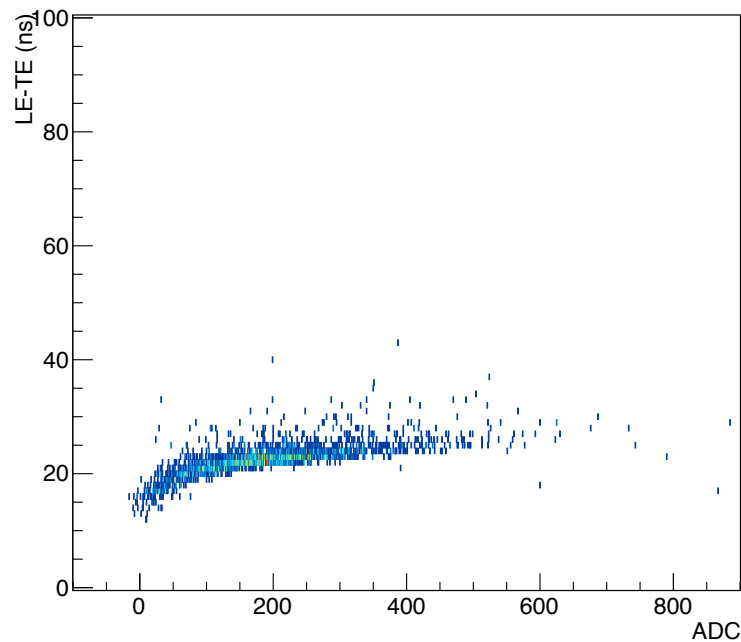
hRise\_53



hADC\_53



ADC53 vs ToT53





- **William and Mary commitment:**
  - Deliver a completed GRINCH detector, DAQ system, and analysis software that is ready for installation in Jan-2020
  - Complete data analysis for first SBS experiment
  - Remain experts and maintain detector for entire SBS program
- **Status:**
  - Todd Averett-primary focus, on sabbatical 2019-20, looking for support to remain at Jefferson Lab
  - 50% of FTE postdoc
  - 1 graduate student, summer 2019, begin thesis full time summer 2020
- **Remaining Tasks:**
  - Construction and cosmic testing of full DAQ
  - Development of online and offline software
  - Investigate possibility of using GRINCH for PID trigger



# Detailed Timeline

- 15-Oct-2018 First cosmic data using full DAQ
- 15-Jan-2019 Major cosmic tests completed, assuming no delays:
  - Above will be interrupted and delayed depending on movement of BigBite detector stack to new location and movement and integration of electronics into BigBite weldment, estimate 2 months?
- 15-May-2019 Completion of software development
- 15-Aug-2019 Development of PID trigger complete