

SAMPA Test Stand Overview

(A) Fundamental Measurements – (gain 20, 30 mV/fC)

- (1) Noise and detector capacitance
- (2) Linearity
- (3) Time resolution
- (4) Charge collection time and pulse shape
- (5) Crosstalk

(B) GEM Readout 1

- (1) Robust ground connection between FECs and GEM
- (2) Faraday cage reduces noise to minimum
- (3) Cosmic ray trigger to readout card captures windows of streamed data (48 Gb/s)
- (4) Windows of raw streamed data written to disk

(C) GEM Readout 2

- (1) Pedestal database for all FEC channels
- (2) SAMPA threshold values for all channels based on pedestal database
- (3) Study GEM pulse data (e.g. pulse shape, time resolution of correlated hits)
- (4) Stream continuous GEM data over the network

(D) TDIS

- (1) Direct triggering of SAMPA chips (non-continuous mode)
- (2) Readout prototype mTPC
- (3) FECs with new SAMPA chip (80 ns shaping time)

(E) Firmware upgrades

- (1) Modify current readout card firmware to stream only hit data to PC memory
- (2) Pulse feature extraction

(F) Integrate FELIX read out hardware/software

- (1) Use FELIX software to configure FEC (GBTx, GBT-SCA, SAMPA)
- (2) Modify FELIX firmware for GBT wide bus mode (no forward error correction)