

# FADC Electronics/DAQ for TPC readout

Fred Gray



MuSun Collaboration workshop  
January 3-4, 2008

- How many channels do we have?
- What's the likely data rate, and can we handle it with a scheme similar to muCap/muLan?

# Electronics/DAQ for TPC readout

- Geometry is still uncertain.
- Working assumption: 15x28 grid of 1x1 cm<sup>2</sup> pads: total of 420 channels.
- Options for readout with sufficient dynamic range:
  - 12-bit ADC (Louvain/Berkeley type), or
  - Two 8-bit ADC channels (BU type) with different gains.
- We do not have 420 channels of Louvain/Berkeley or 840 channels of BU electronics, so we may have to build something new anyway.

# Data rate: looks feasible

- Assume the average muon stops halfway down the longitudinal axis:
    - 14 pads long.
  - ...and that it distributes its charge between two adjacent lines of pixels:
    - 2 pads wide.
- > 28 pad hits/muon
- Assume 32 samples per pad hit.
  - Louvain/Berkeley: 9 bytes/4 samples = 2.25 bytes/sample
  - BU: 2 x 40 bytes/32 samples = 2.5 bytes/sample
  - $(27 \times 10^3 \text{ muon/s})(28 \text{ pads/muon})(32 \text{ samples/pad})(2.5 \text{ bytes/sample})$   
= 54 MB/s
  - Divided over 420 Louvain/Berkeley channels:
    - 0.1 MB/s/channel, 1 MB/s/board (easy!)