

# FADC Electronics/DAQ for TPC readout

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- 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: 10x10 grid of 1x1 cm<sup>2</sup> pads: total of 100 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 have 100 channels of Louvain/Berkeley or 200 channels of BU electronics, so either option could work.

# Data rate: looks feasible

- Assume the average muon stops halfway down the longitudinal axis:
    - 5 pads long.
  - ...and that it distributes its charge between two adjacent lines of pixels:
    - 2 pads wide.
- > 10 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
  - $(27 \times 10^3 \text{ muon/s})(10 \text{ pads/muon})(32 \text{ samples/pad})(2.5 \text{ bytes/sample})$   
= 22 MB/s
  - Divided over 100 Louvain/Berkeley channels:
    - 0.2 MB/s/channel, 1.7 MB/s/board (easy!)