

# Carleton Update on LC TPC Readout Studies

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# Current Activities & Plans

- Continue mini-TPC cosmic ray test analysis for longitudinal track fit
- Continue double GEM charge dispersion studies
- Micromegas with a resistive anode for charge dispersion studies
  - Collaborators: Paul Colas (Saclay) & Vincent Lepeltier (Orsay)
  - First observation of charge dispersion signals in a Micromegas
  - Continue Micromegas charge dispersion studies in collaboration with Saclay/Orsay
- Modify mini-TPC for cosmic & beam tests with a resistive anode MPGD readout
  - New 128 channel endcap will replace the existing 64 channel motherboard
  - 64 additional channels of 200 MHz FADCs received from U. Montreal
  - DAQ development in progress

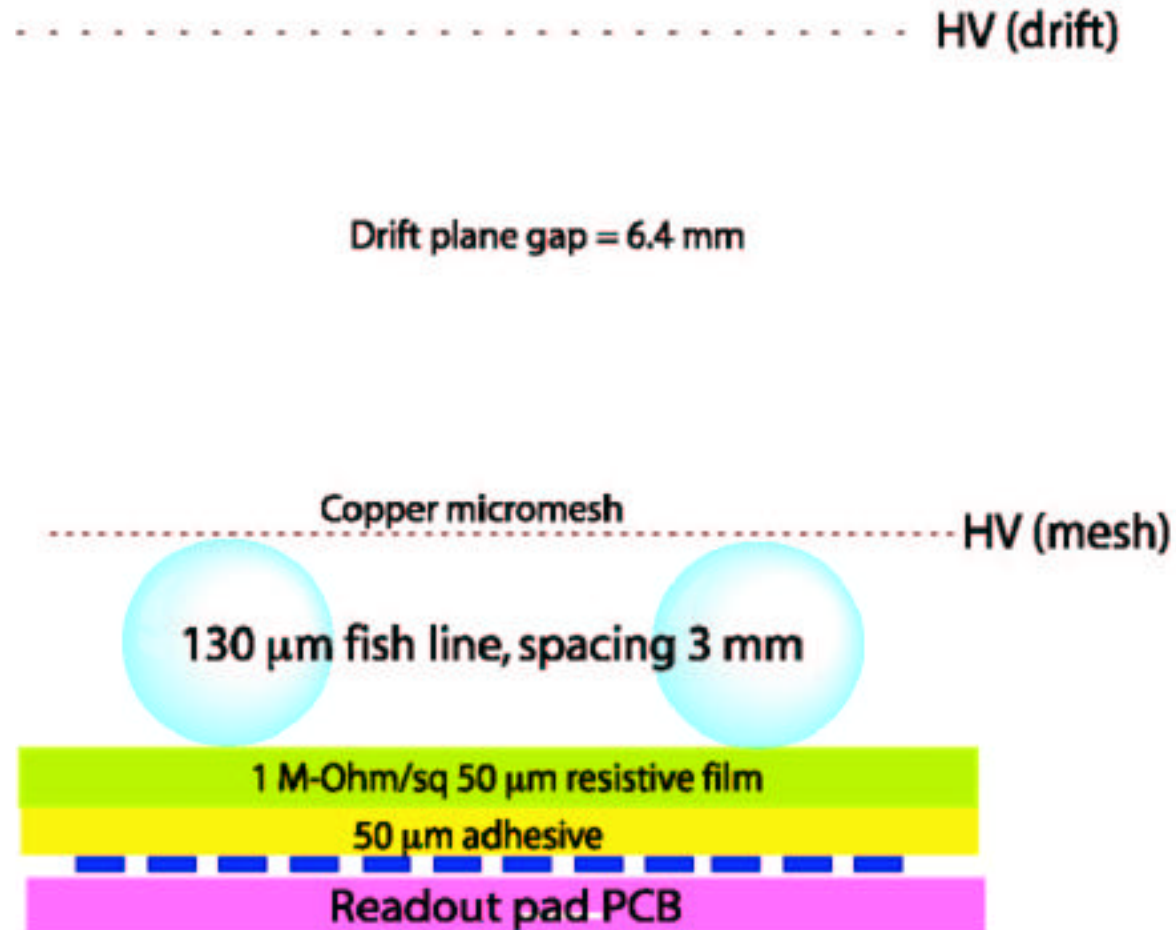
# Double GEM charge dispersion studies

- Concept feasibility has been demonstrated with 2.5 M-Ohm/sq foil
- Pad response was too narrow with 2.5 M-Ohm foil
- New 1 M-Ohm/sq resistive anode foil installed for more reasonable PRF
  - First tests show reasonable PRF width
  - Continue resolution studies with long strips and hex pads
  - Complete charge dispersion tests with realistic 2 mm x 6 mm pad readout geometry

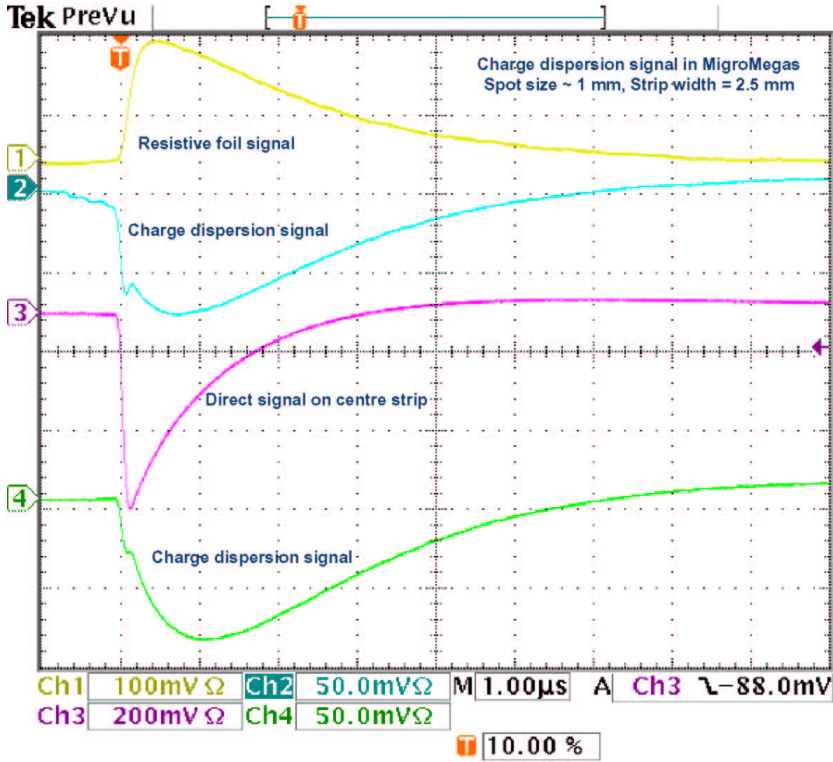
# A resistive anode Micromegas for charge dispersion

- Collaborators: Paul Colas (Saclay) & Vincent Lepeltier (Orsay)
- 1 M-Ohm/sq foil with readout identical to GEM test cell
- Copper micromesh pre-stretched on a frame fabricated by CERN
- Micromegas gap  $\sim 130 \mu\text{m}$  (fish line @ 3 mm spacing)
- $^{55}\text{Fe}$  collimated source for primary ionization
- Observe first Micromegas charge dispersion signals with anode strips and hexagonal pads
- $130 \mu\text{m}$  not ideal for P10 (argon optimum  $\sim 30 \mu\text{m}$ ) leads to gain sensitive to gap non-uniformity

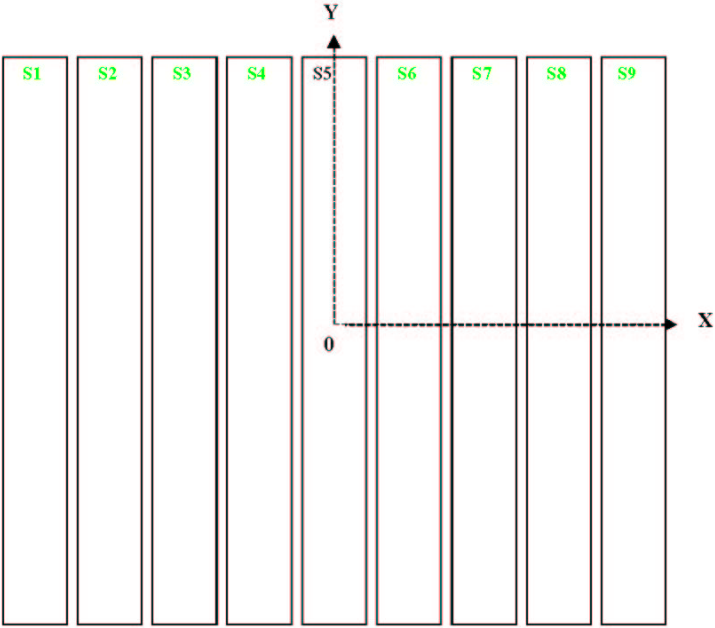
# Resistive anode Micromegas for charge dispersion



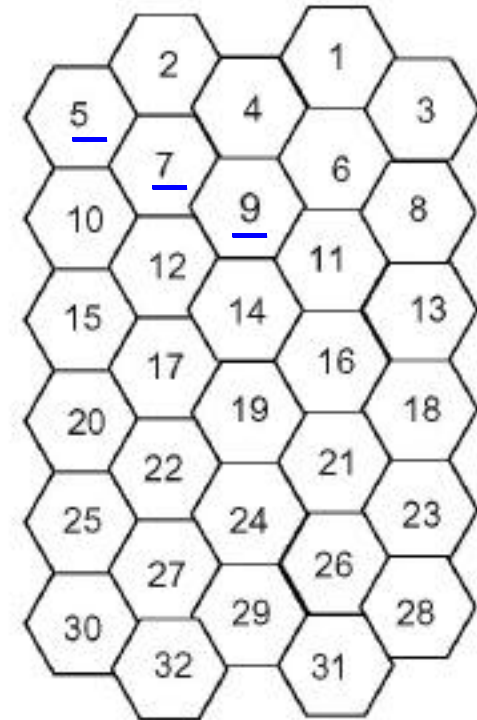
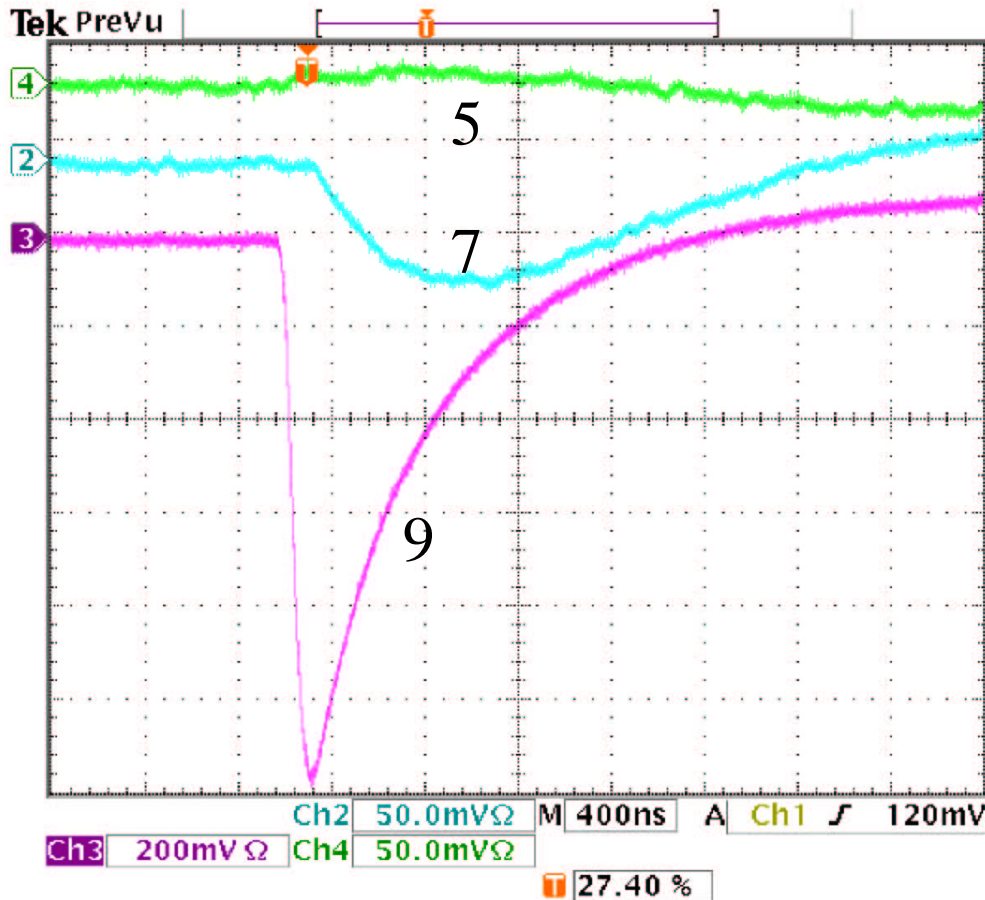
# Charge dispersion signal on 2.5 mm wide x 7 cm long readout pads Ionization spot size $\sim 700 \mu\text{m}$ centred on strip 3 (collimated Fe55 source)



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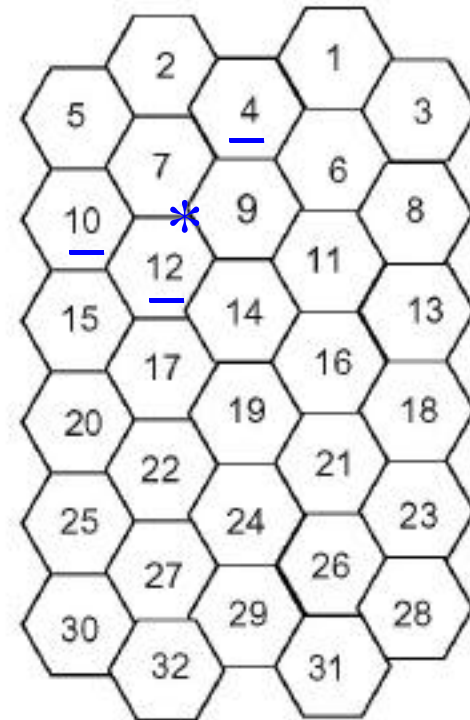
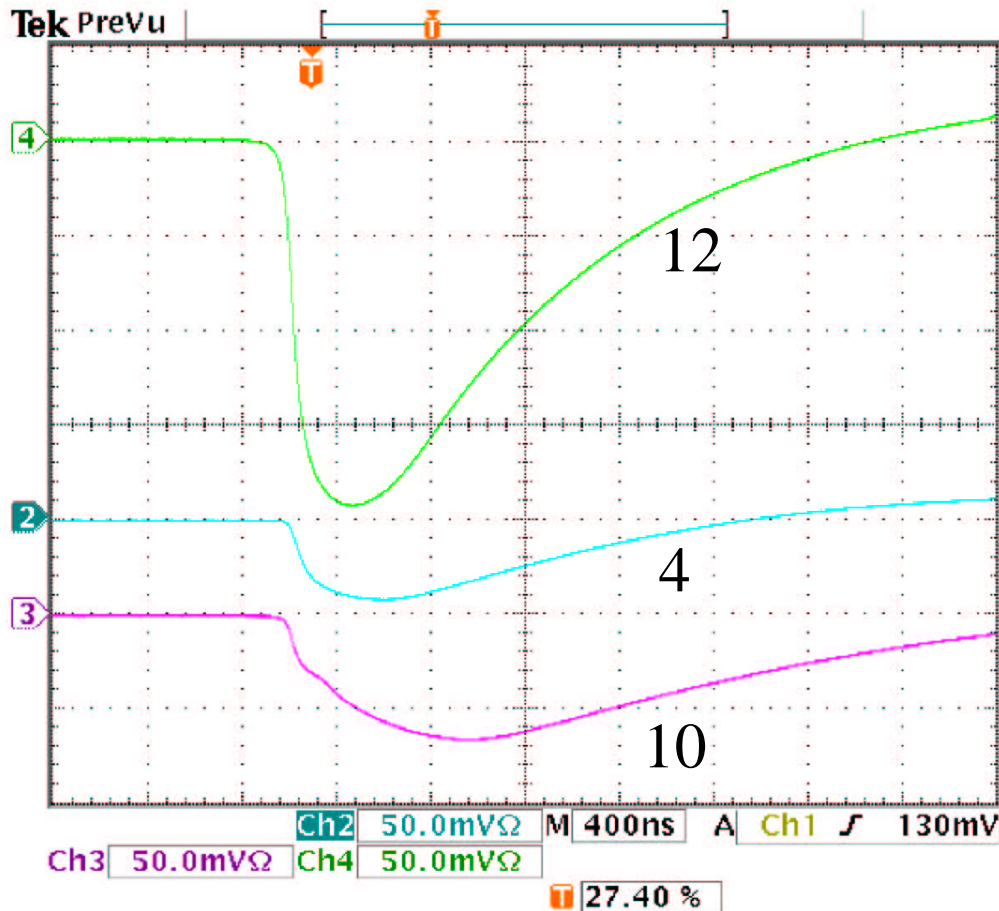


Single event - Micromegas read out with 2.5 mm hex pads  
 Ionization spot size  $\sim 700 \mu\text{m}$  centred on pad 9  
 Observed charge dispersion signal on pads 9, 7 and 5  
 (direct charge, first neighbor & next neighbor dispersion signals)



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Micromegas read out with 2.5 mm hexagonal pads  
 Ionization spot  $\sim 700 \mu\text{m}$  spot at corner of pads 7, 9 & 12  
 Signals observed on pads 12, 4 & 10  
 (Direct charge, far neighbor and near neighbor)



21 Feb 2003  
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