Ecogas summary

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EP-DT
Detector Technologies

Outline

- Data analysis of ECO2 mixture

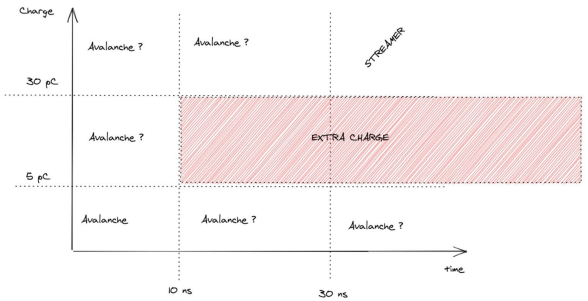
Data analysis of ECOGAS2

Setup

- 1 single gap, 2mm GT bakelite RPC 80cmx100cm
- Trigger: coincidence with 2 scintillators 20cmx40cm
- Readout: 7 strips, 2.1 cm, 50 Ohm terminated with CAEN v1730 readout (0.122 mv/adc, 500 Ms/s)
- Flow: ~ 3 vol/h

Analysis methods

1. EPDT:
   a. Efficiency: height (1.2 mV) + pulse shape discrimination (for cross-talk induced signals)
   b. Signal discrimination avalanche/streamer: 12mV height + 5 pC charge
   c. Knee/working point estimation: sigmoid fit for knee; knee + 200 V for working point
2. Tor Vergata:
   a. Efficiency: height > 5 RMS of the baseline
   b. Signal discrimination:



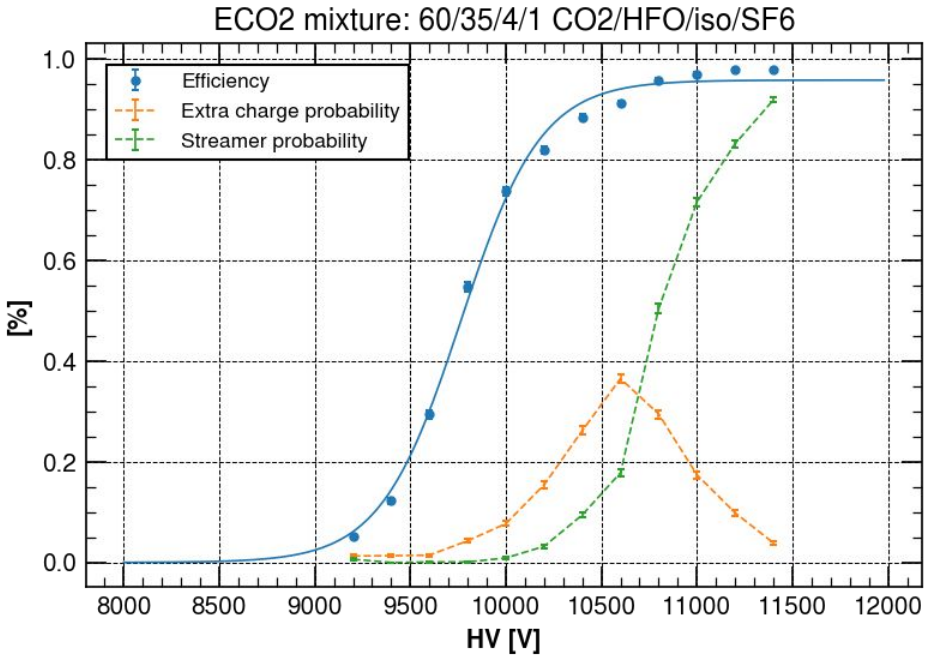
Preliminary results

Preliminary results

- *Results are preliminary* as we rewrote completely the analysis code
- The setup is different as we have 7 strips readout vs 1 strip for TV group
- For each trigger event I selected the biggest charge and used that as a reference

Results:

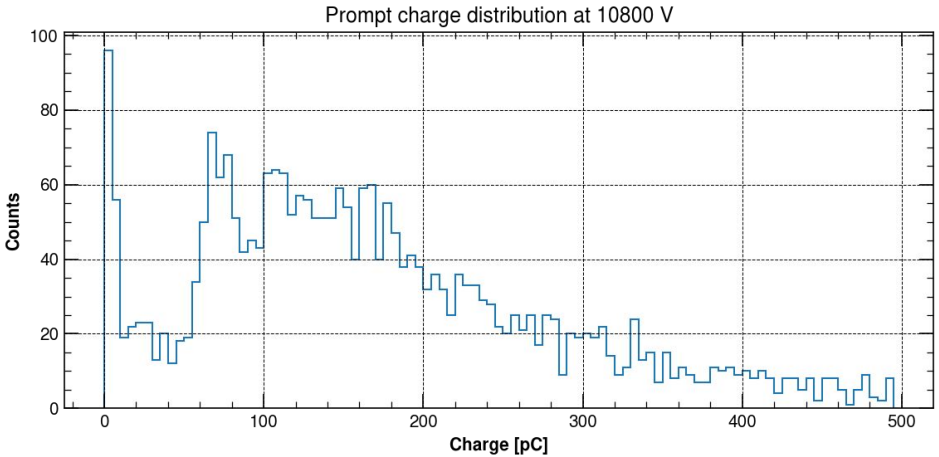
- Knee at ~ 10700 V, working point 10900
- The streamer probability is ~ 50% at w.p.

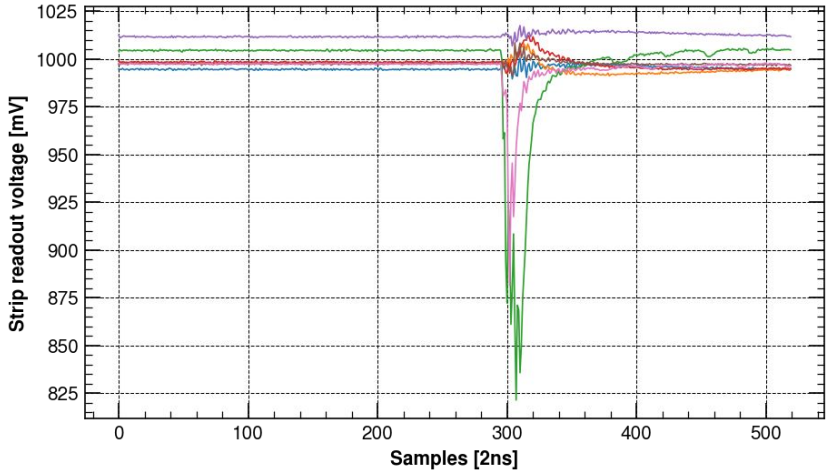


Preliminary results

Results

- Charge distribution shows a separation at ~ 30 pC
- The charge is distributed across > 1 strip

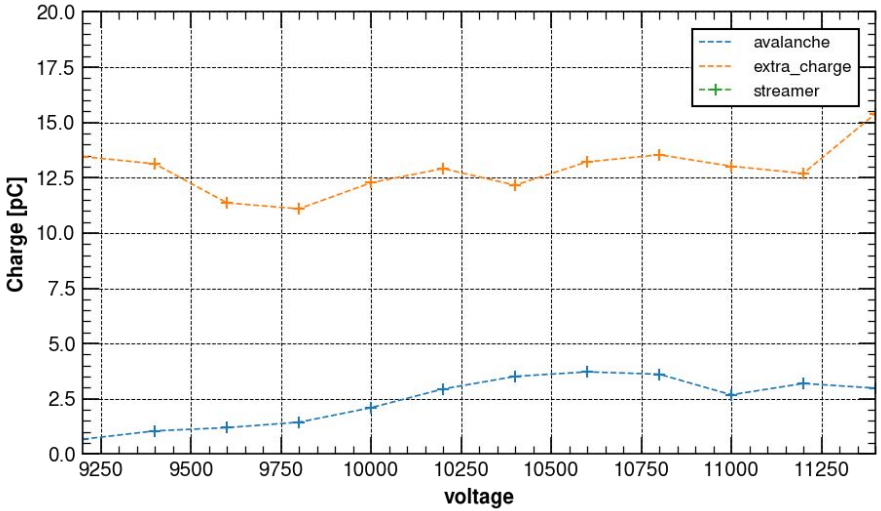


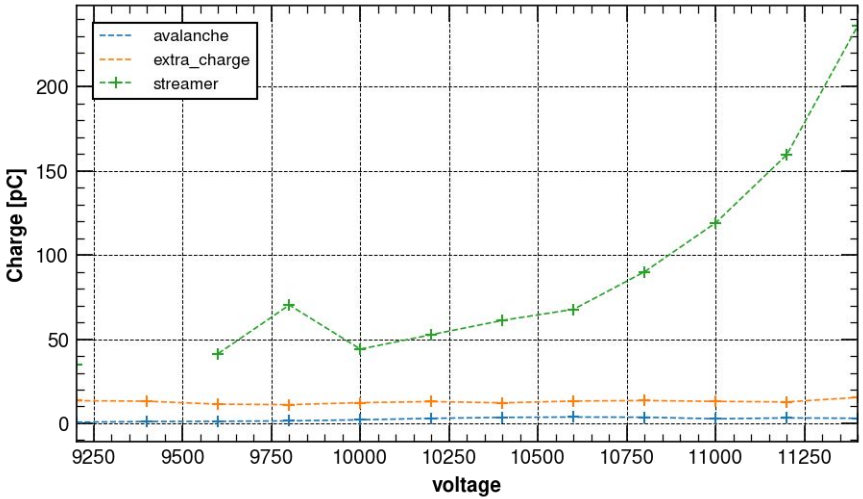


Preliminary results

Results

- Mean avalanche charge seems to be around 2.5 pC at w.p.
- Extra charge is fluctuating around 12.5 pC





Results

- Streamer charge is increasing exponentially and it is about ~ 100 pC at w.p.

Preliminary results

Results

- Lot of events with ToT > 400 ns and charge up to 1nC