Status of the FTMv4t2 foil characterization in Ghent

Christos Roskas
So far

• Linearity of collected current on the Anode wrt to X-ray flux

• Effective gain measurement attempts, 2 setups
  • Keithley 6487 Pico-ammeter
  • High-res power supply CAEN 1471H

• Performed simulations with ANSYS & Garfield++
To re-cap – Prototype design

The prototype right now is a fully resistive μR WELL

Drift foil

Drift gap 5mm

DLC FTM foil: 50 μm
DLC Anode foil: 50 μm

Prototype’s single layer

DLC:
- FTM foil: ~ 120-150 MΩ/sq
- Anode foil: ~ 30-50 MΩ/sq
Re-cap

• Linearity plot and the first drift scan

Linearity observed.
Proceeded to signal observation
Effective gain measurement.
Signal observation – Failed

The setup used for this output was

- Panasonic-to-LEMO
- Preamplifier ORTEC 142PC
- Amplifier ORTEC 474
- Scope

- Not able to observe rate
- Not able to observe spectrum
- Not able to justify the bipolar character

Possibly amplified reflections
Gain measurements

• First attempts and measurements failed as the gun was too far away from the prototype ~ 1m

• Placed the gun closer

• Kept track of the Anode current in the beginning
Gain measurements

• Moved the source as close as possible to the prototype

Compared to previous work i.e. *Federica’s work in Bari*
We expect a flatter region – an ionization region.
Does not seem to be the case...
Gain Measurements

• Keep track of the current collected to all layers
  • Drift, $FTM_{TOP}$ (DLC), Anode foil (DLC).

• Scanned the amplification voltages $10 – 60$ kV/cm
  • Made use of the high-res PS as the pico-ammeter measurements were biased
Gain Measurements

28/01/2020

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FTM – Prototype Simulation

• Simulate the foil FTMv4t2 created/used
Measured collection efficiency and Eff. Gain

• Compare the collection efficiency with the data for the Current collected on the layers
Measured Collection efficiency and Eff. Gain

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Measured Collection efficiency and Eff. Gain
Future plans

• I will be at CERN for the RD51 week (present the work there maybe?)

• We still have a Cu cladded WELL foil which was not tested (50μm – 100μm diameters)