

Digitization

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digitization @ beginning of 2018

FULLY IMPLEMENTED IN GTS, not yet in CgemBoss

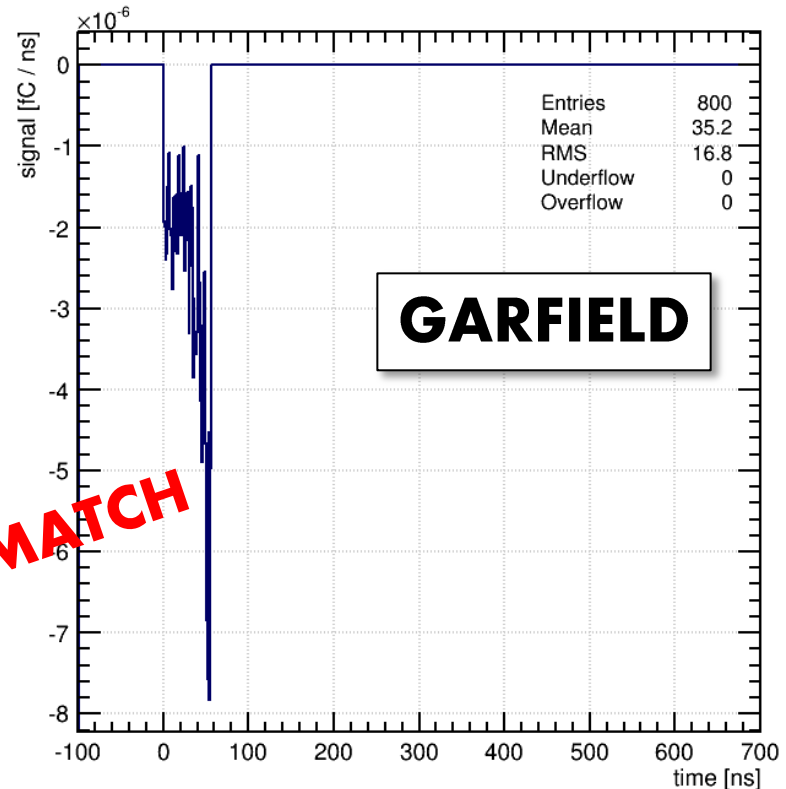
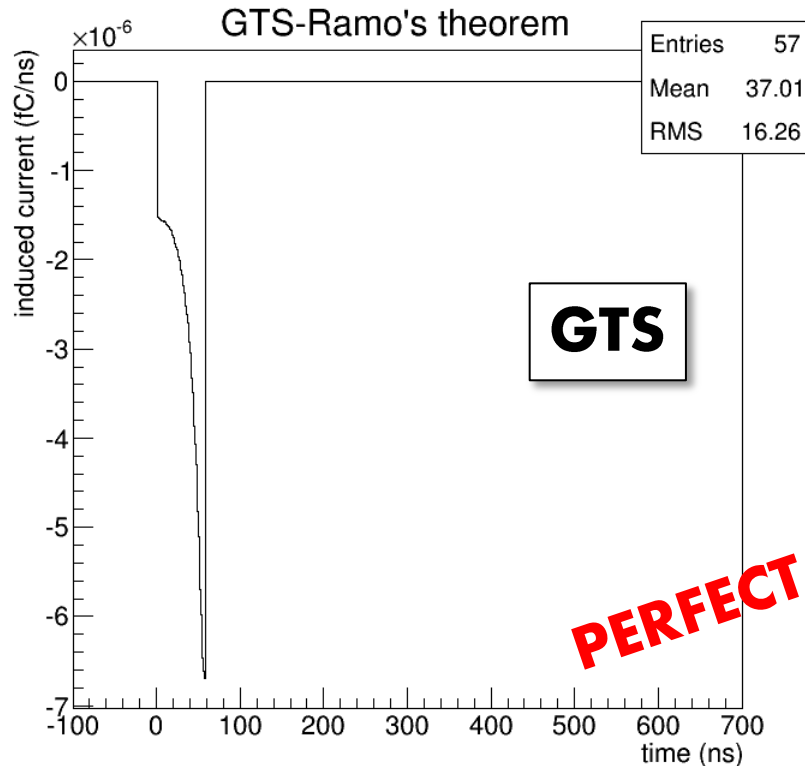
- ✓ **INDUCTION** of the signal:
 - Ramo's theorem → induced current on the strip
 - Capacitive induction (as from lab tests)
 - APV-25 response:
 - Charge threshold
 - RC circuit response → recorded current → recorded charge
- ✓ **TIME** of the signal determination adapted to the new simulation of the formation of the signal → **micro-TPC reconstruction available** (in GTS)
- ✓ **NOISE** updated, with dependence on time

Induction

Ramo's theorem: $i(t) = q_{e-} \times v_{\text{drift}} \times W_{\text{loc}}$

- Weighted field calculated from ANSYS/GARFIELD++
- Simulation inside GTS standalone code

COMPARISON BETWEEN GTS & GARFIELD FOR 1 ELECTRON EXITING GEM3

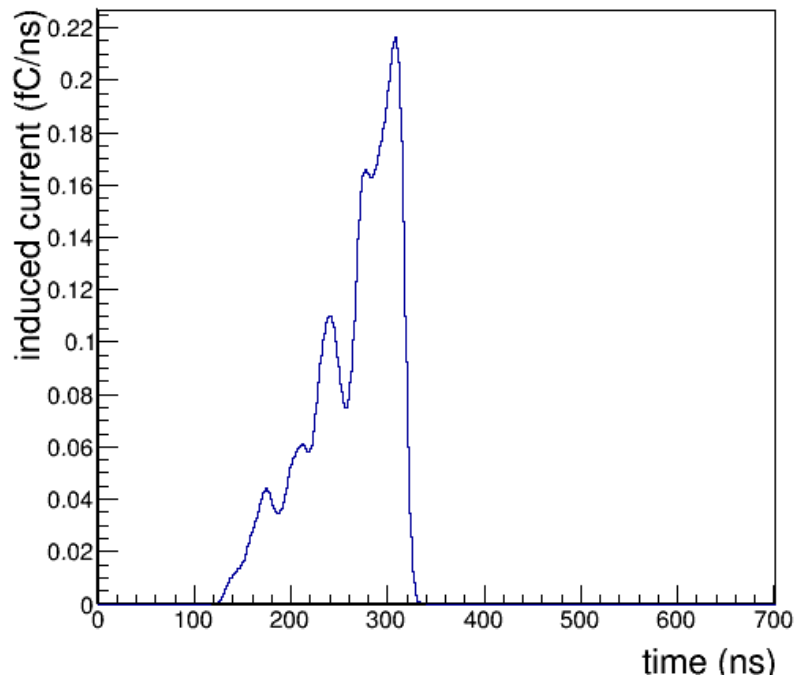


PERFECT MATCH

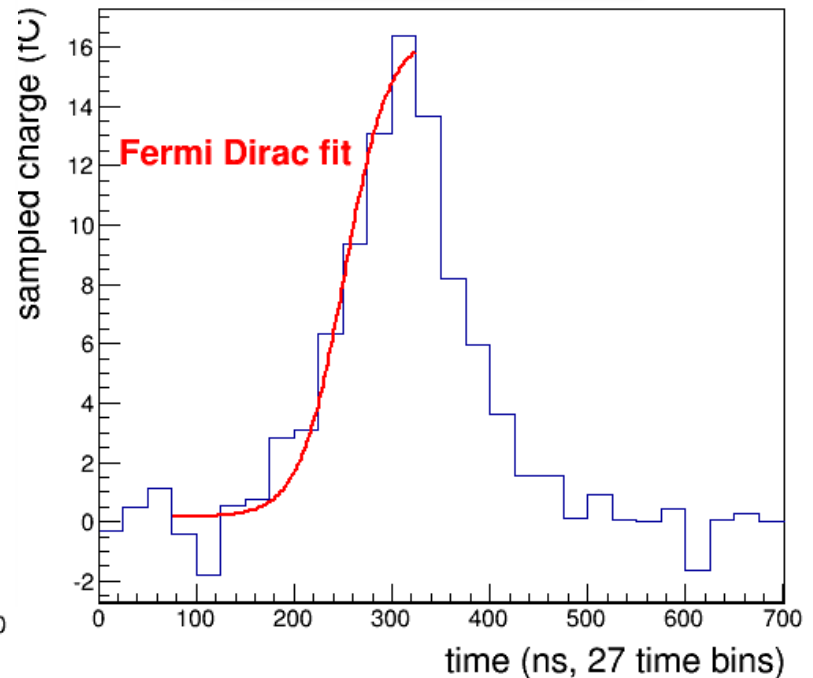
RC circuit effect

- APV-25 RC circuit charge and discharge effect simulated
- $\tau = 50$ ns

Induced current



Read charge



Tuning on TB data

- 5 incident angles 0, 10, 20, 30, 45 deg
- HV = 820 V
- Fields = 1.5/3/3/5 kV/cm
- **SIGNAL FORMATION AND READOUT (APV-25) NEW**

WE CAN ACT ON:

- Noise level
- APV threshold
- Conversion Factor (ADC→fC)

WE CAN MONITOR

- Recorded charge
- Cluster size
- CC resolution
- uTPC resolution
- uTPC angle reconstruction

NOW

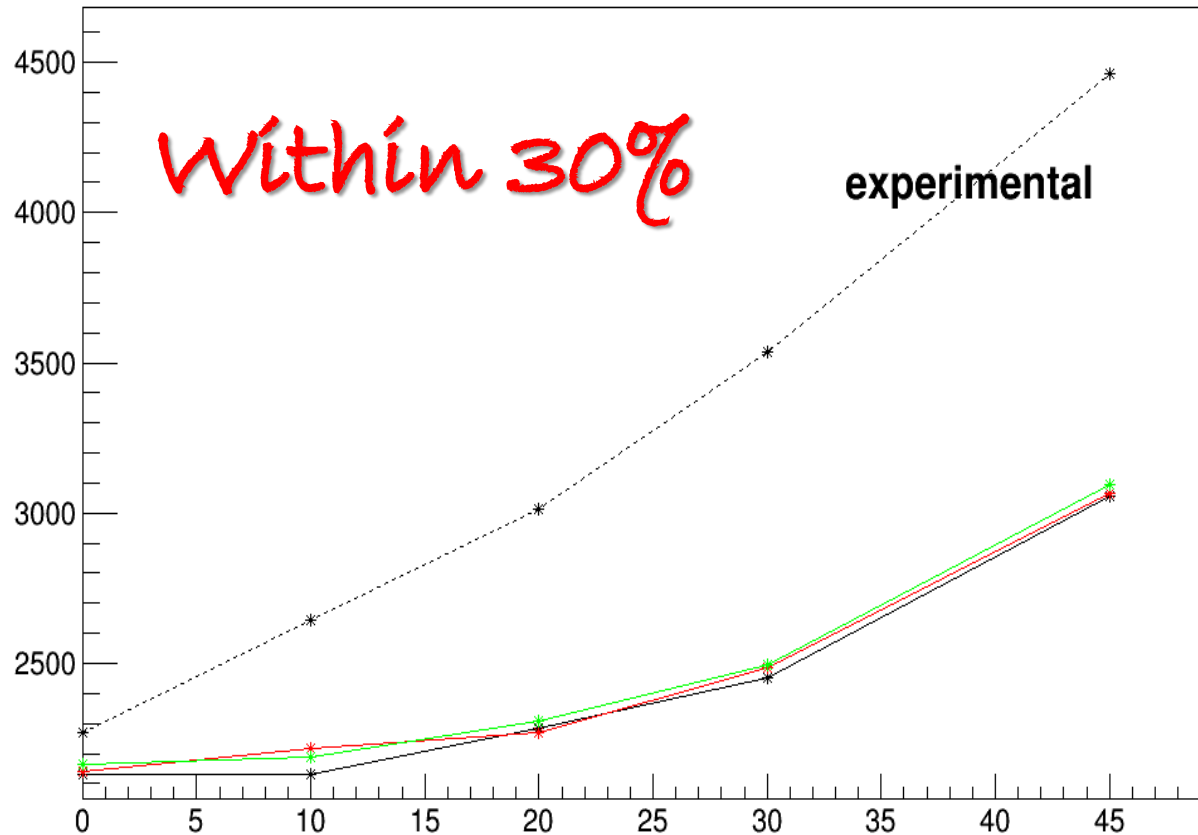
Noise level = 0, 1, 5 ADC

APV threshold = 45 ADC

Conversion Factor = 30 ADC = 1fC

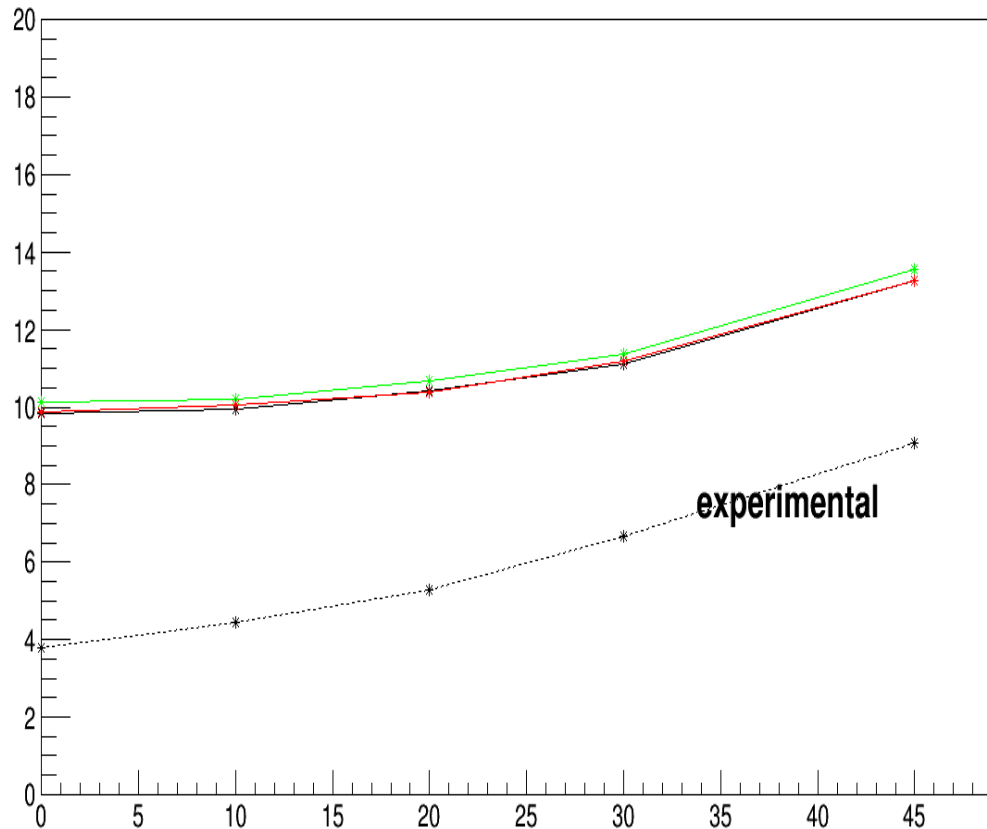
Tuning on TB data

Charge (ADC) vs angle (deg)



Tuning on TB data

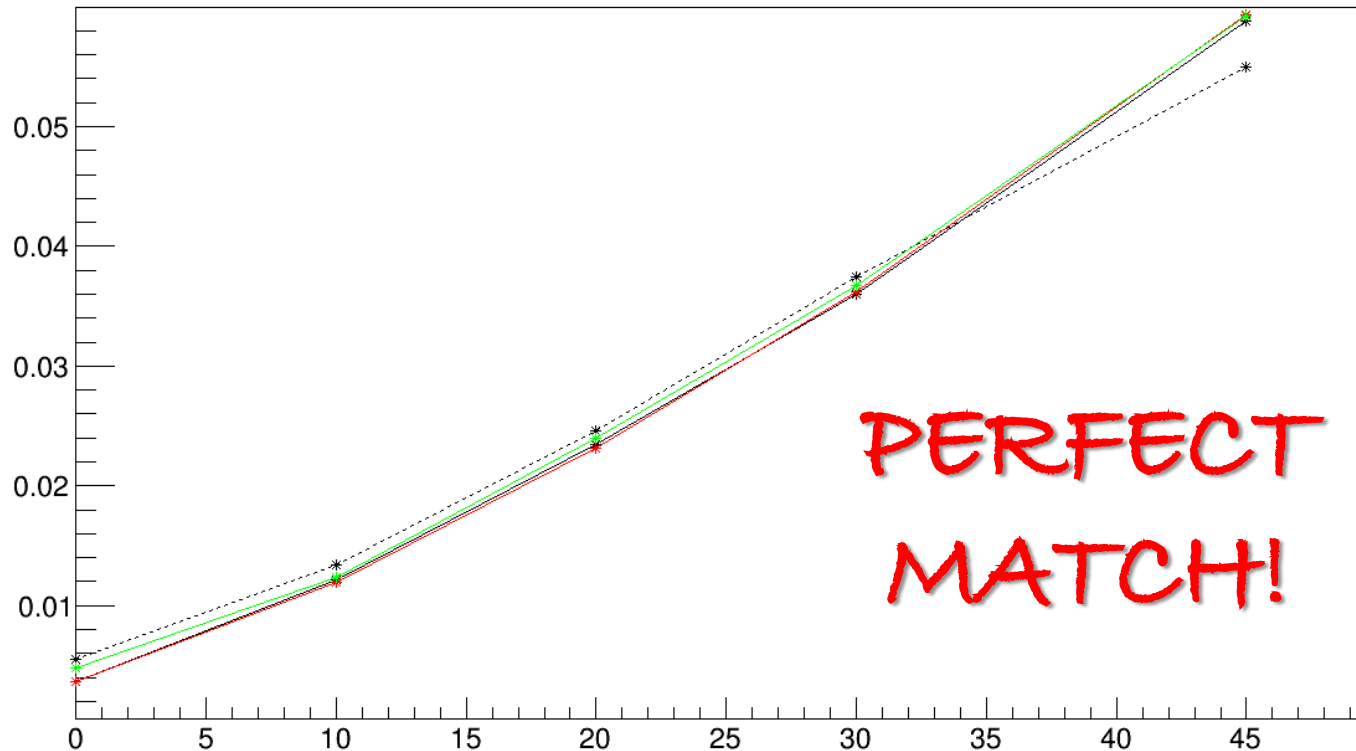
Cl.size vs angle (deg)



Simulated is twice as experimental
→ work on it!

Tuning on TB data

CC resolution vs angle (deg)



Tuning on TB data

- The results with the uTPC are not matching the data since they depend on the cluster size which is still too high
→ **Tuning ongoing, more results soon**

Passive material
L. Lavezzi – M. Melchiorri

Passive elements

Passive elements implementation in Geant4

- simplified CAD description by M. Melchiorri
- conversion to Geant4 volumes ongoing
- maybe GDML

