ABOUT MYSELF:

Education:

Master student in physics and astronomy at the Vrije Universiteit Brussel Belgium.

Bachelors thesis:

An original theoretical study concerning the precise definition of chaos in quantum mechanics.
CONTENTS:

1. Gas gain simulations
2. Surface potential calculations
3. Asymmetry of GEM geometry
4. Summer(y)
GAS GAIN SIMULATIONS:

For Gas Electron Multiplier (GEM) detectors a quantitative understanding of the gas gain is still lacking.

Gas gain = the multiplication factor between initial and final amount of electrons.
AVENUES OF EXPLORATION:

We are exploring this discrepancy between experiment and theory in the following ways:

- shortcomings for finite element field calculations,
- modeling the drift of an electron,
- Penning transfer,
- surface potential calculations and
- asymmetry in GEM hole geometry.
Besides the accumulation of avalanche charge on the GEM we calculate the surface potential using the surface resistivity of polyimide.
ASYMMETRY OF GEM GEOMETRY:

Asymmetries in the geometry of a GEM can occur due to the etching processes.
ASYMMETRY OF GEM GEOMETRY:

A difference in diameter between the bottom and top hole has an impact on the gas gain.

\[ E_{\text{drift}} = 2 \text{ kV/cm}, \]
\[ E_{\text{induction}} = 3 \text{ kV/cm} \]
\[ \text{Ar-CO}_2 (70-30) \]
\[ r_p = 0.56 \]
In my search to find the difference in the simulated and measured gas gain I have learned:

- theory behind gas detectors,
- assembling and operating a GEM detector,
- simulation techniques,
- working with ANSYS® software and ROOT and
- the inner workings of CERN.

Still 5 weeks left to continue with my project.
ACKNOWLEDGEMENTS:

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Thank you for your attention!

M. Alfonsi et al., CERN-LHCC-2008-011.
