ALICE setup in H4:

Stability measurement of readout chamber prototype for the ALICE TPC

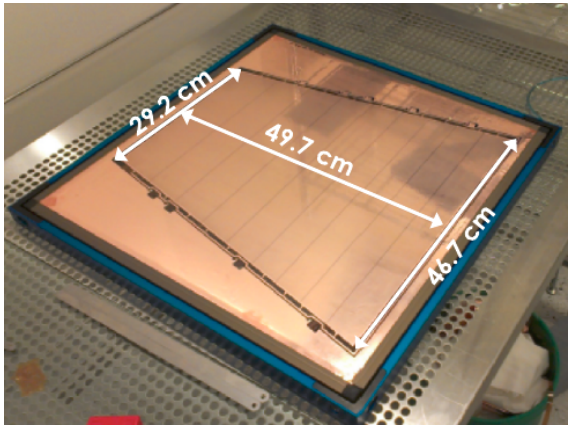
Alexander Deisting on behalf of the ALICE TPC upgrade team

Universität Heidelberg/Gesellschaft für Schwerionenforschung GmbH

9th of December, 2014

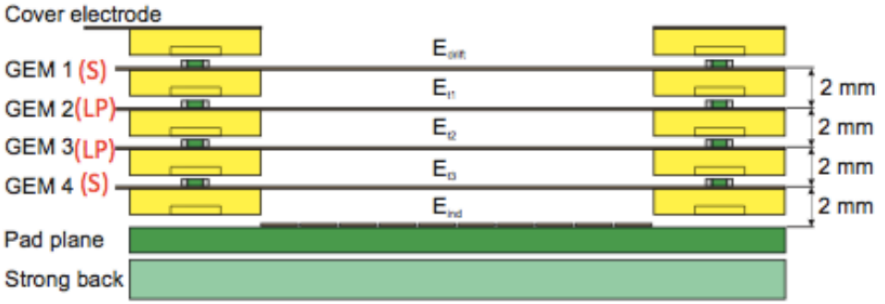
4GEM large size **I**nner **R**ead**o**ut **C**hamber prototype

- Utilises an existing chamber support with readout plane
- GEMs (singel mask etching technique) are mounted on top



Presented in the TDR:

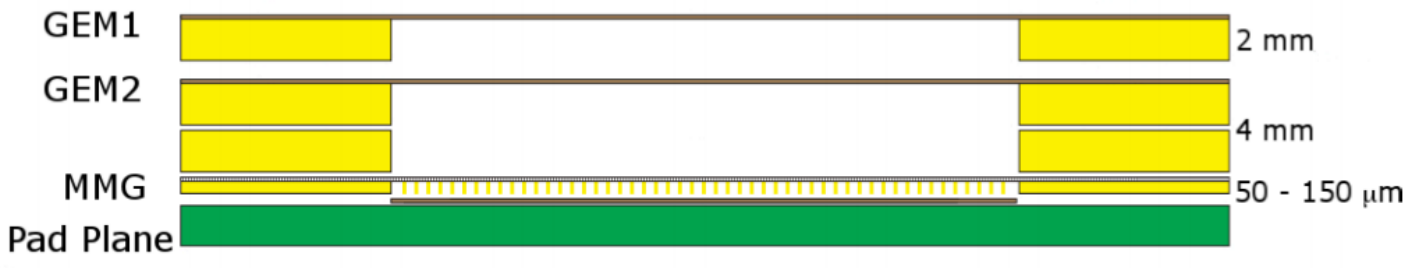
- Quadruple GEM stack with **S**tandard (140 µm) and **L**arge **P**itch (280 µm) GEMs
- Configuration: S-LP-LP-S
- IBF ~ 0.7 and $\sigma_{\mathrm{E}}/E \sim 12\%$



Micromegas detectors

Hybrid 2GEM + MM prototype

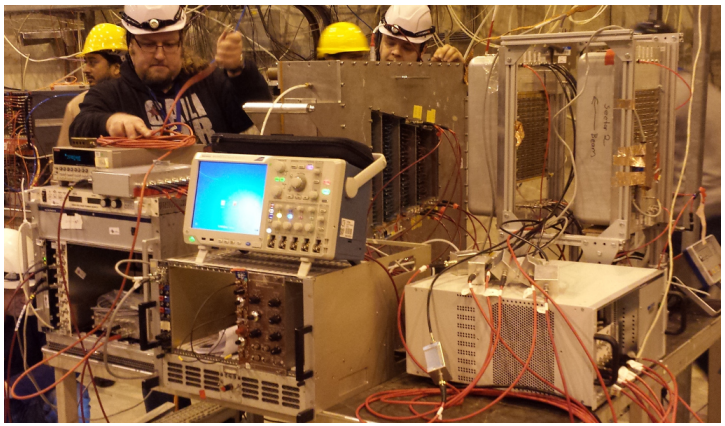
- 2 standard GEMS with one Micromegas
- MM glued onto the pad plane of an existent alu-body from an former MWPC
- Finished right before the beam-time
- Will be mounted in H4 at 9.12.2014

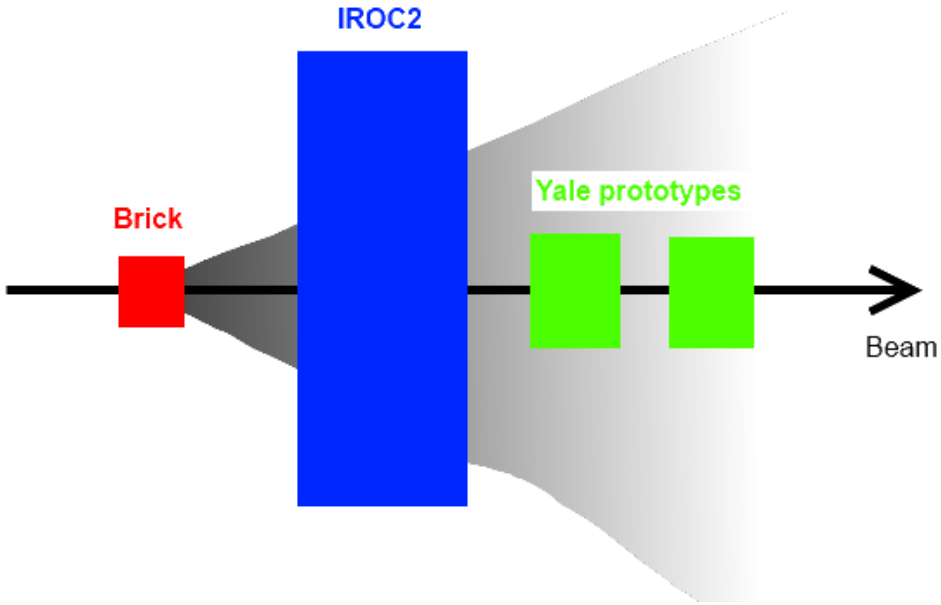


Small prototypes

- 2 standard GEMS with one Micromegas

Setup in the SPS area – 1/2





IROC2 readout

- Resistor → Keithley → Computer
- Discriminator → Scaler
  → Oscilloscope

Setup in the SPS area – 2/2

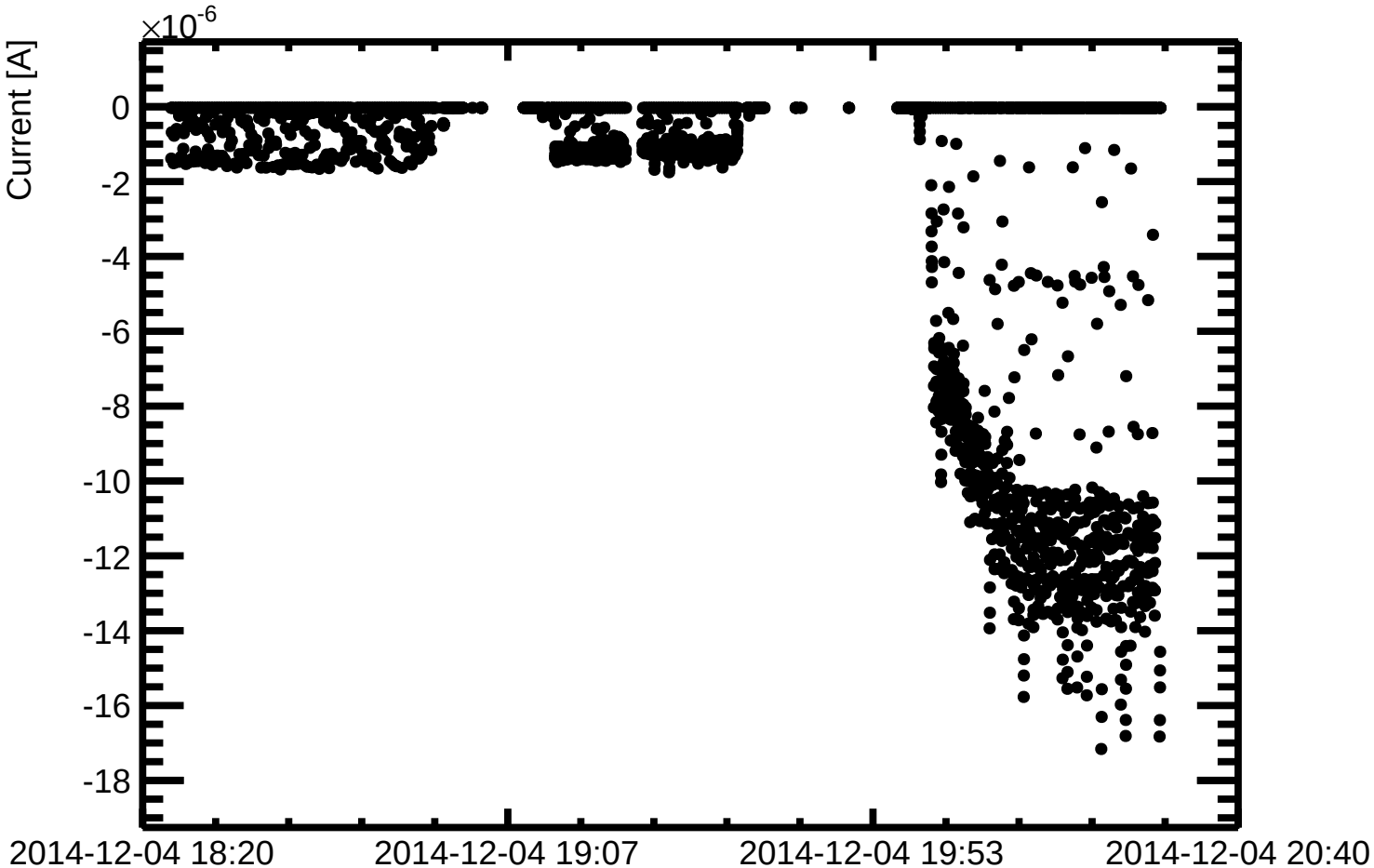
Using a 150 GeV pion beam with the highest intensity possible, we get:

- Rate before the brick (measured with scintillators) $\sim 3 \times 10^6$ particles/spill
- Rate after one Fe brick $\sim 1.5 \times 10^7$ particles/spill
- Rate after three bricks: $\sim 1.2 \times 10^8$ particles/spill

$\Rightarrow$ In the current configuration 7×10^{10} particles/6h
$\Rightarrow$ It is only possible to record reasonable data in our times as main user

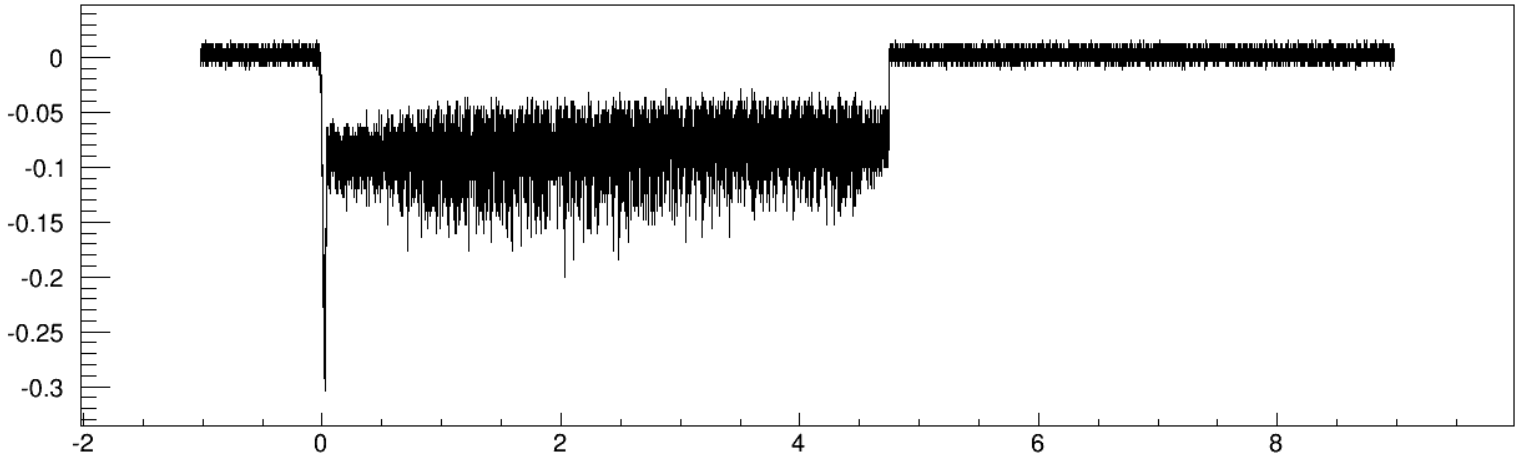
Thanks to Theo, Yorgos and Eraldo! (For advice, help and bricks!)

Current measurement by the Keithley

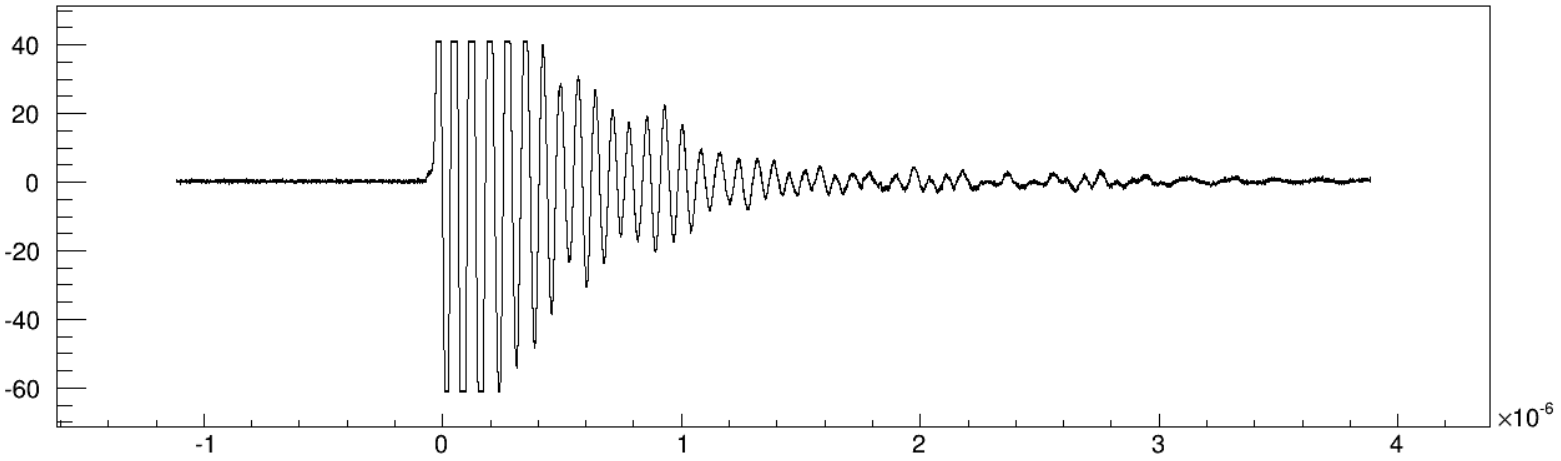


Signals recorded with the Oscilloscope

Spill signal



Spark signal



Summary

- No sparks at the IROC (4GEM) system so far
- A considerable number of sparks in both hybrid detectors
- Most probably we wont reach $\sim 1 \times 10^{12}$ particles

Outlook

- Installation of a large hybrid chamber today
- Install one more layer of bricks

Backup

References & Further Reading

- TDR *ALICE Collaboration, "Technical Design Report for the Upgrade of the ALICE Time Projection Chamber" – ALICE-TDR-016, 2014*
- Chilo *Private communication Chilo Garabatos Cuadrado*
- Gasik *Private communication Piotr Gasik*