



Simulation & Optimization of the Operating Conditions

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Motivation

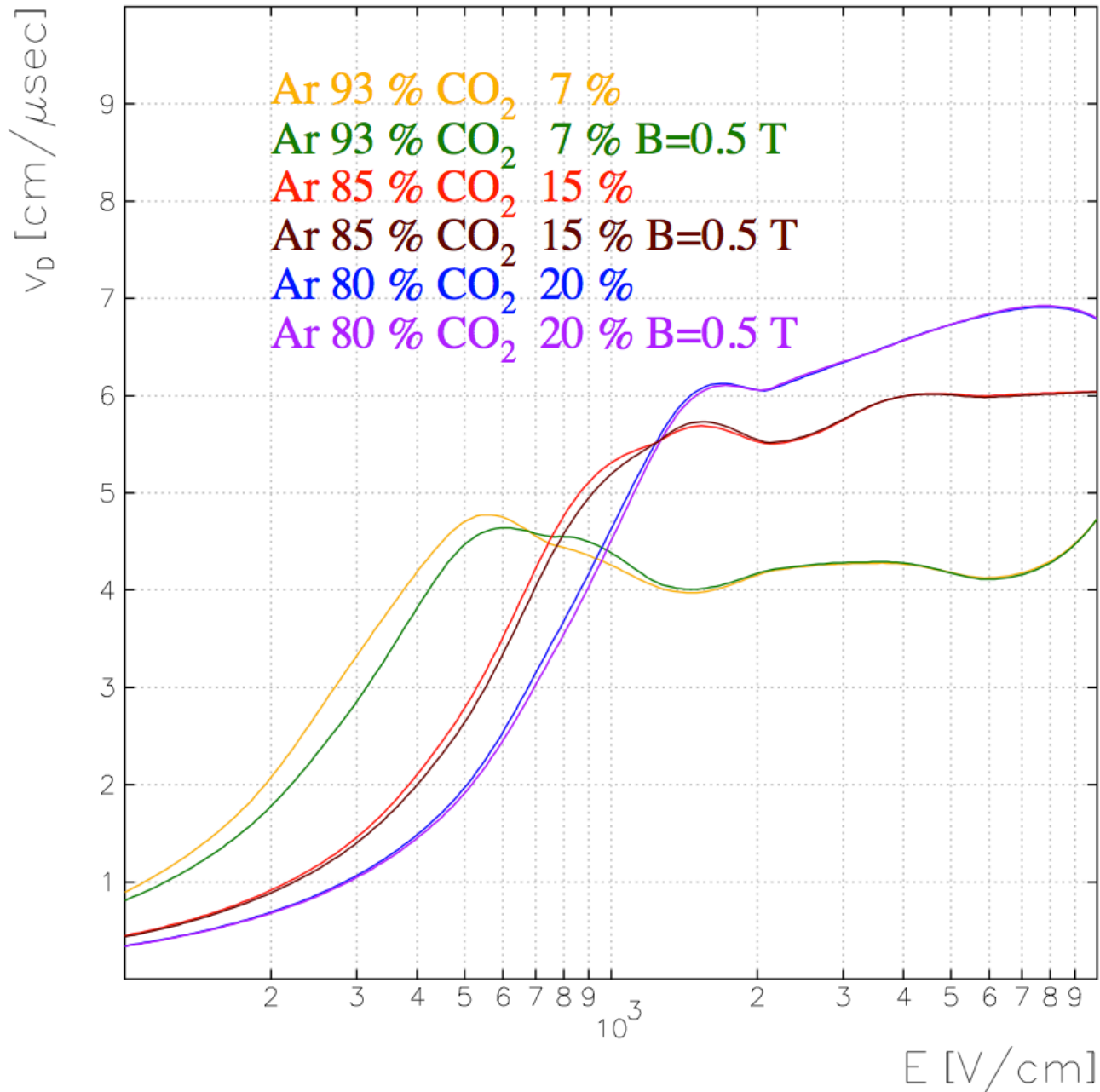
The idea is to show the plans for studies to better optimize the operating conditions which so far we have basically fixed at a gas mixture Ar-CO₂ 93:7. Can we use some other presentence of this gas mixture?

Parameters we'd like to optimize:

- reduce the Lorentz angle
- change the drift velocity -- total drift time
- change the electric field
- check transparency

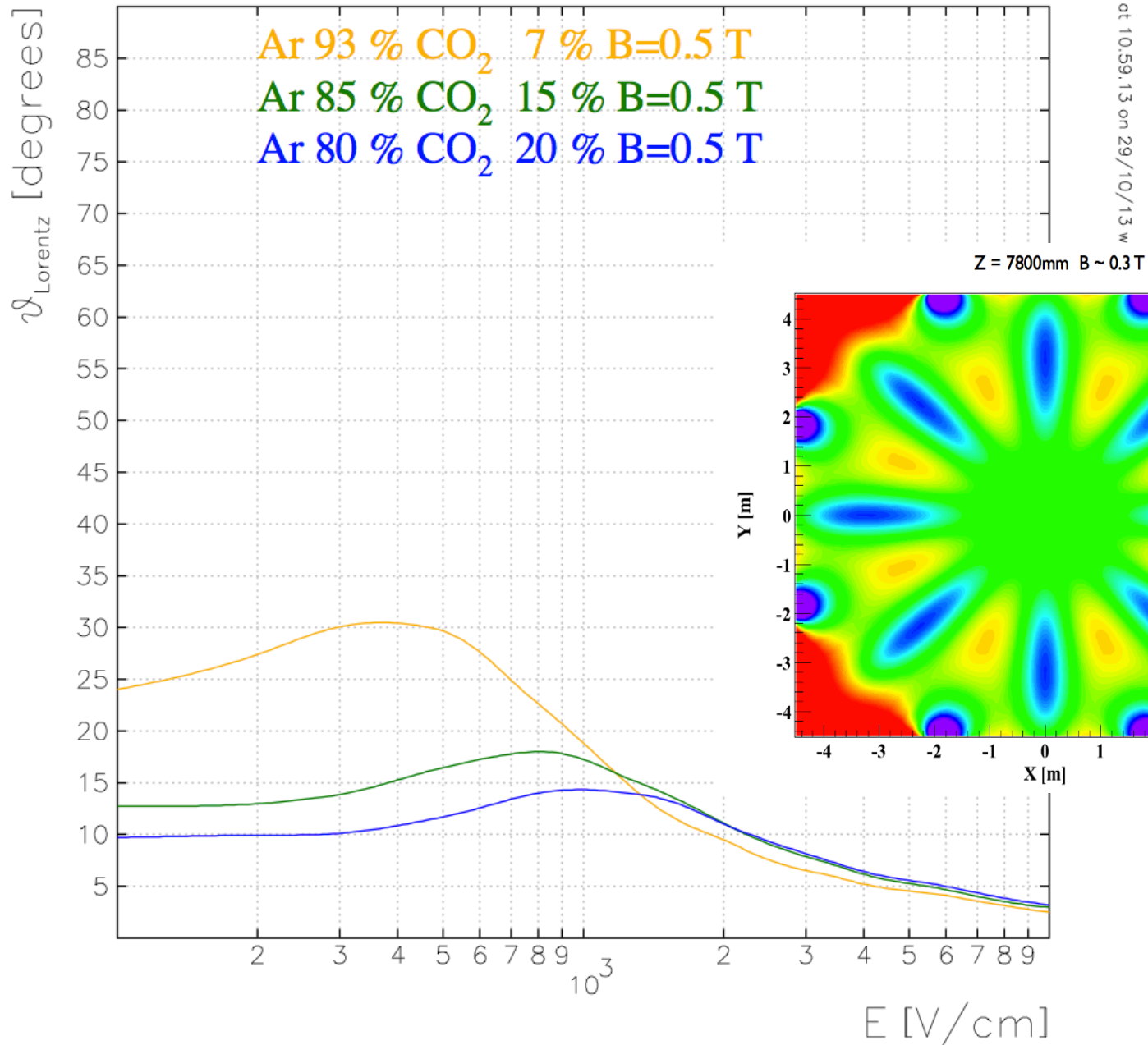
This talk is intending to eject a discussion

Drift velocity

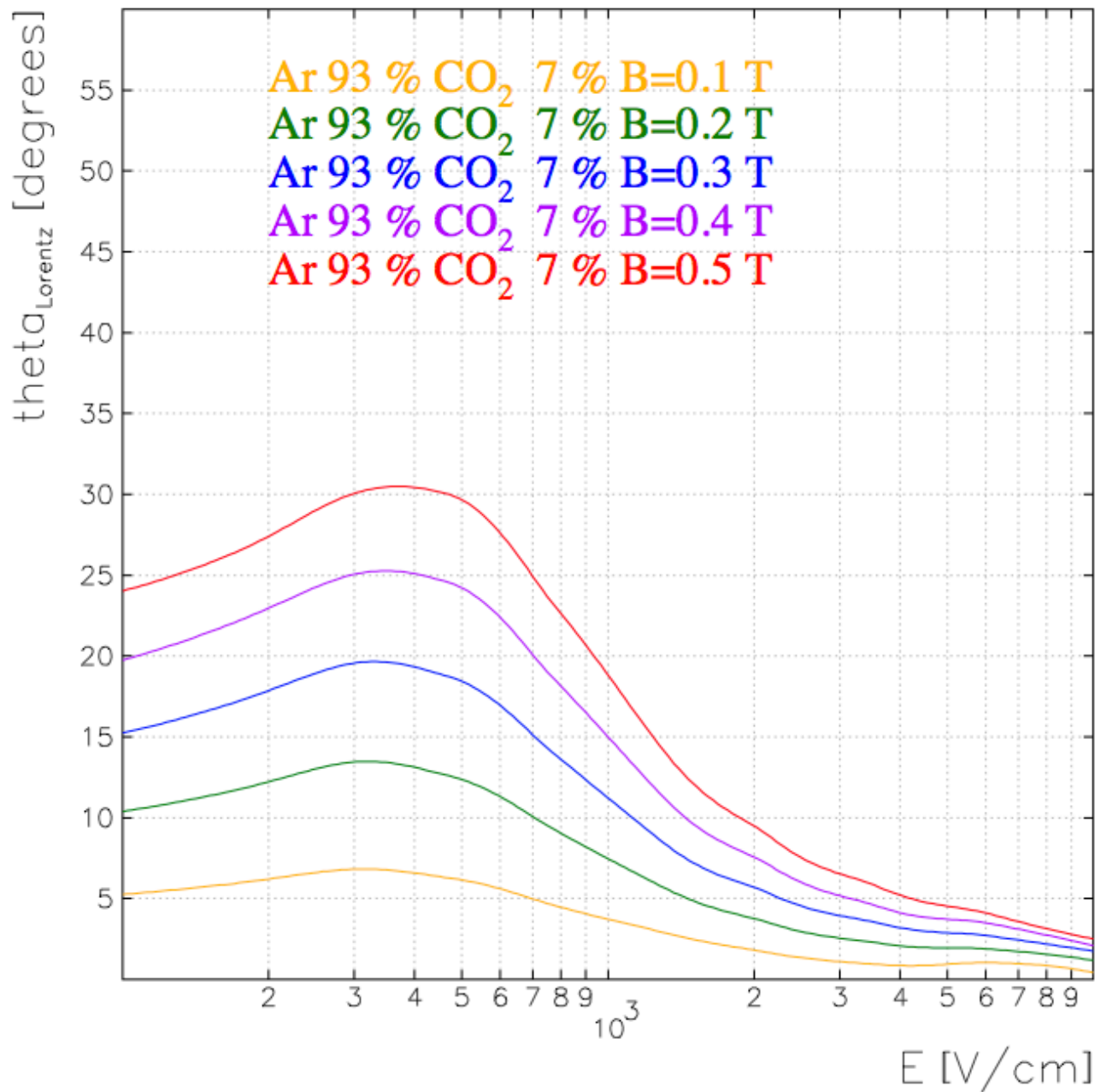


Plotted at 10:59:12 on 29/10/13 with Garfield version 7.44.

Lorentz - angle

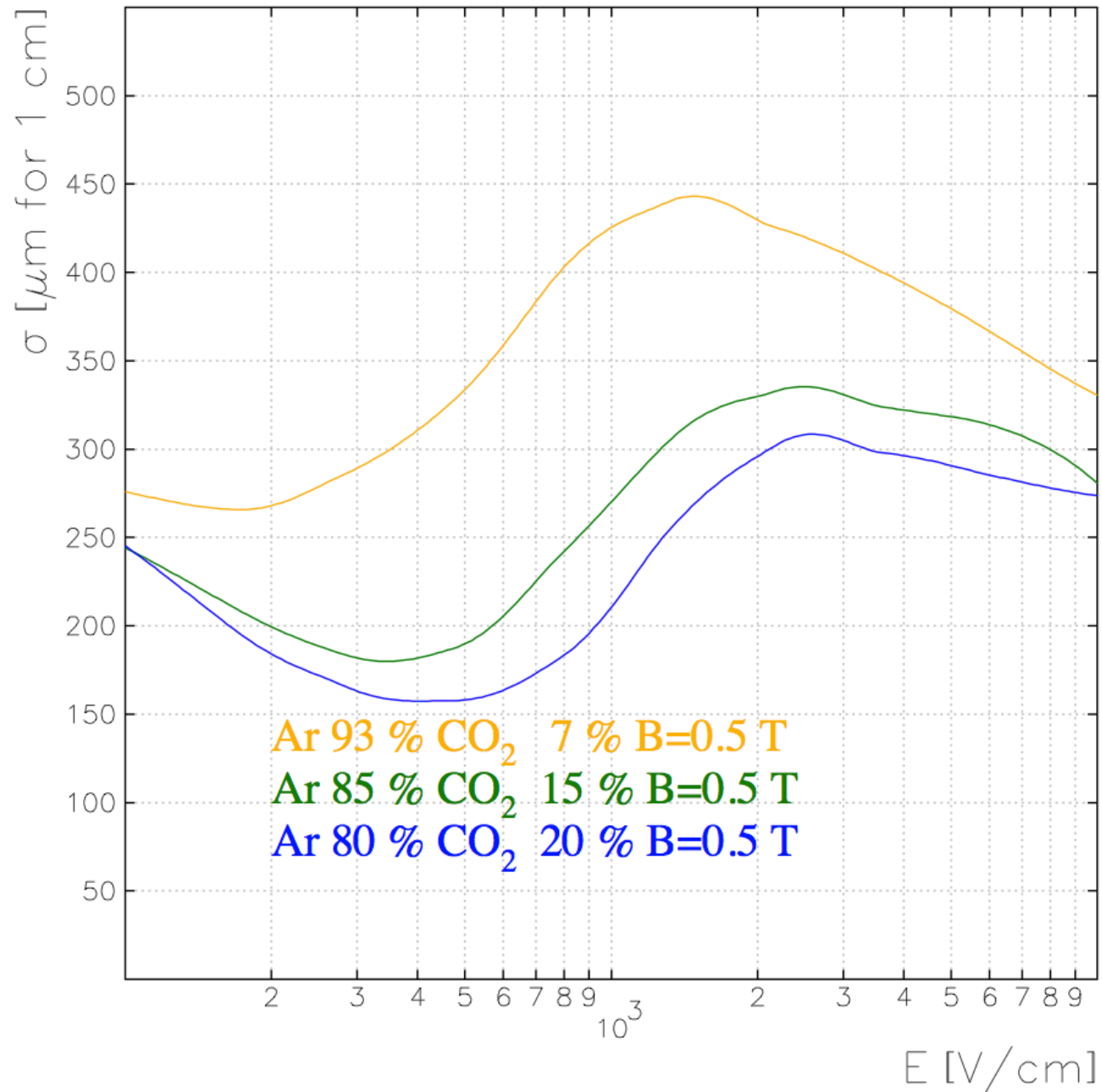


Lorentz - angle



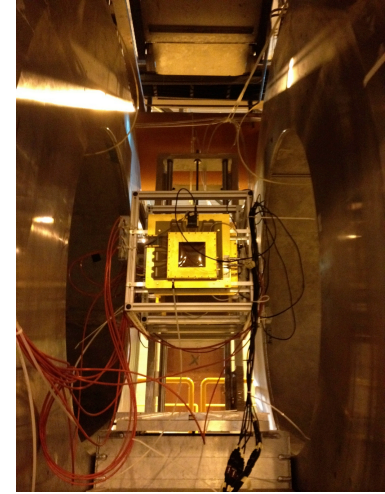
Plotted at 00:25:12 on 01/05/12 with Garfield version 7.44.

Transverse Diffusion

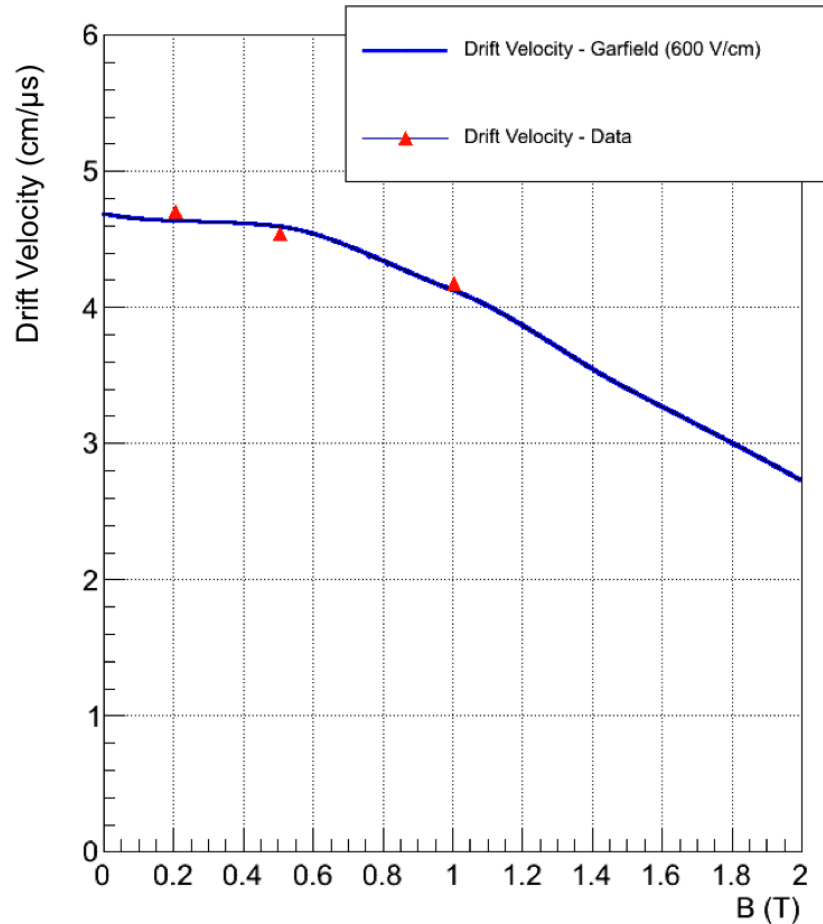
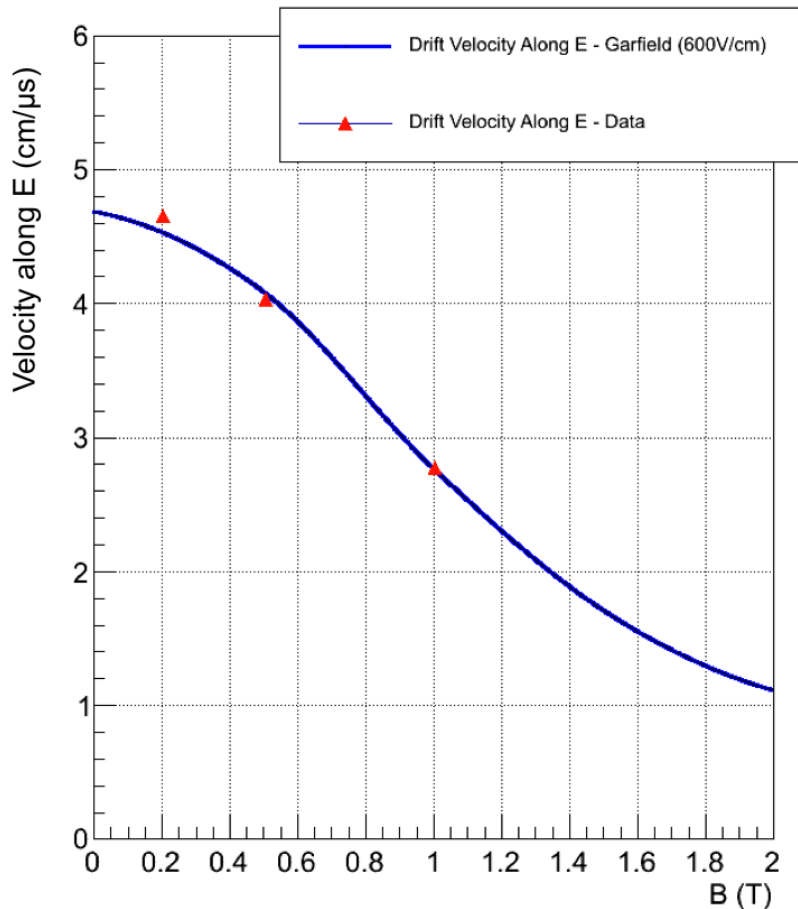


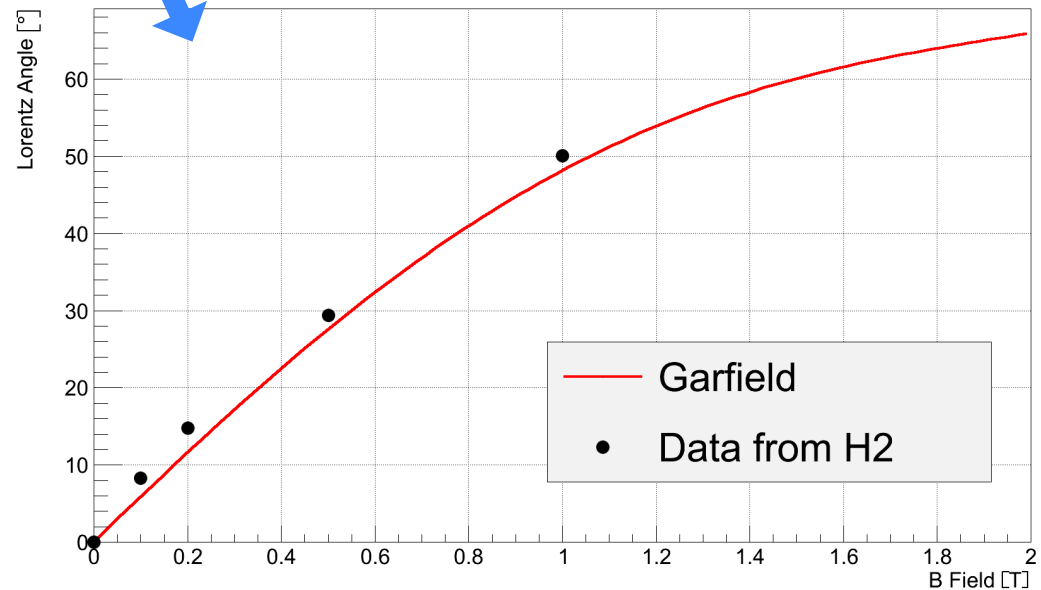
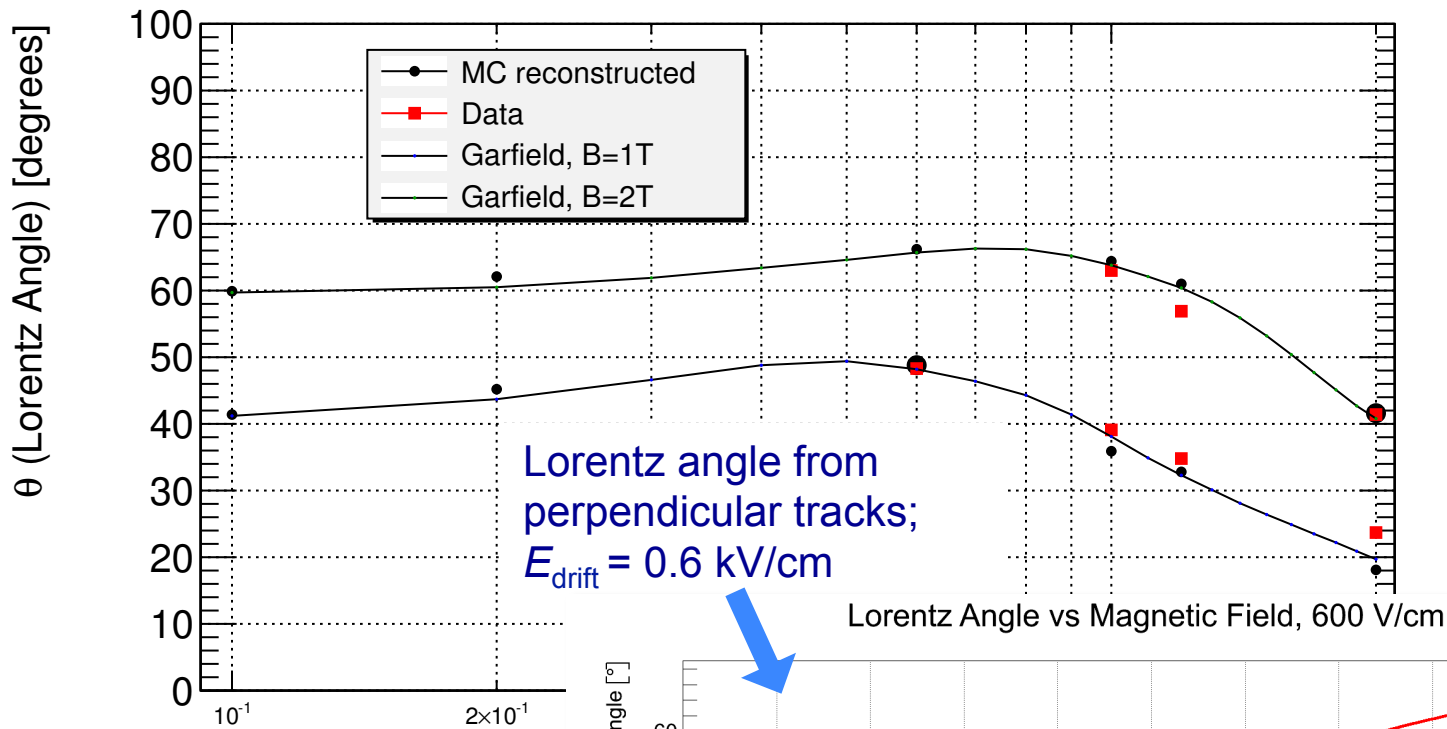
Plotted at 10:59:13 on 29/10/13 with Garfield version 7.44.

Micromegas Performance in B @ H2



- Micromegas chambers tested successfully in a magnetic field up to 1 T showing no performance degradation.
- Lorentz angle & drift velocity measurements compared to garfield





Test Beam in 5.5 MeV Neutrons - Demokritos

R11: Interaction & spark rate/neutron (Ar:CO₂ 93:7 and 80:20)

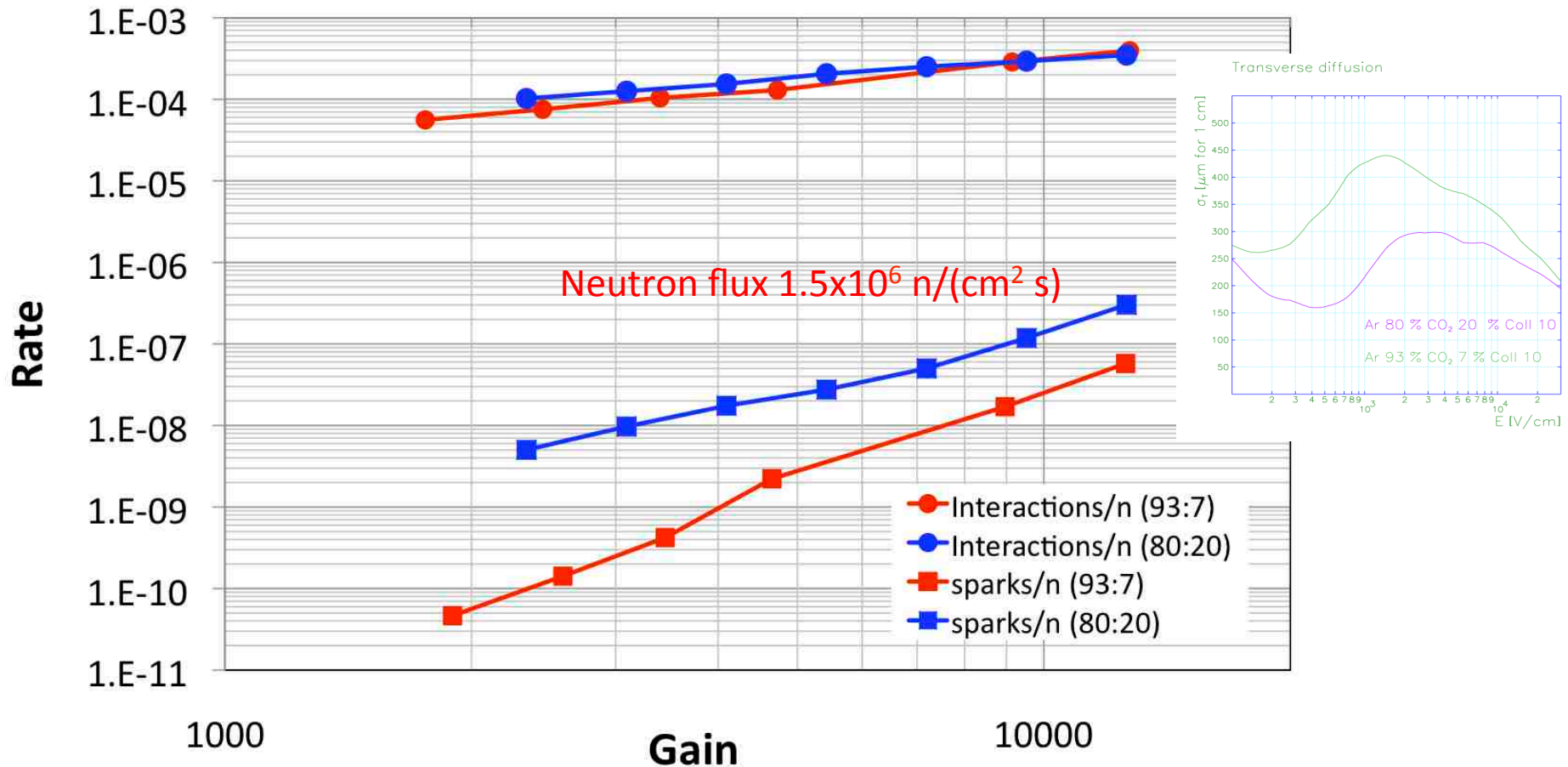
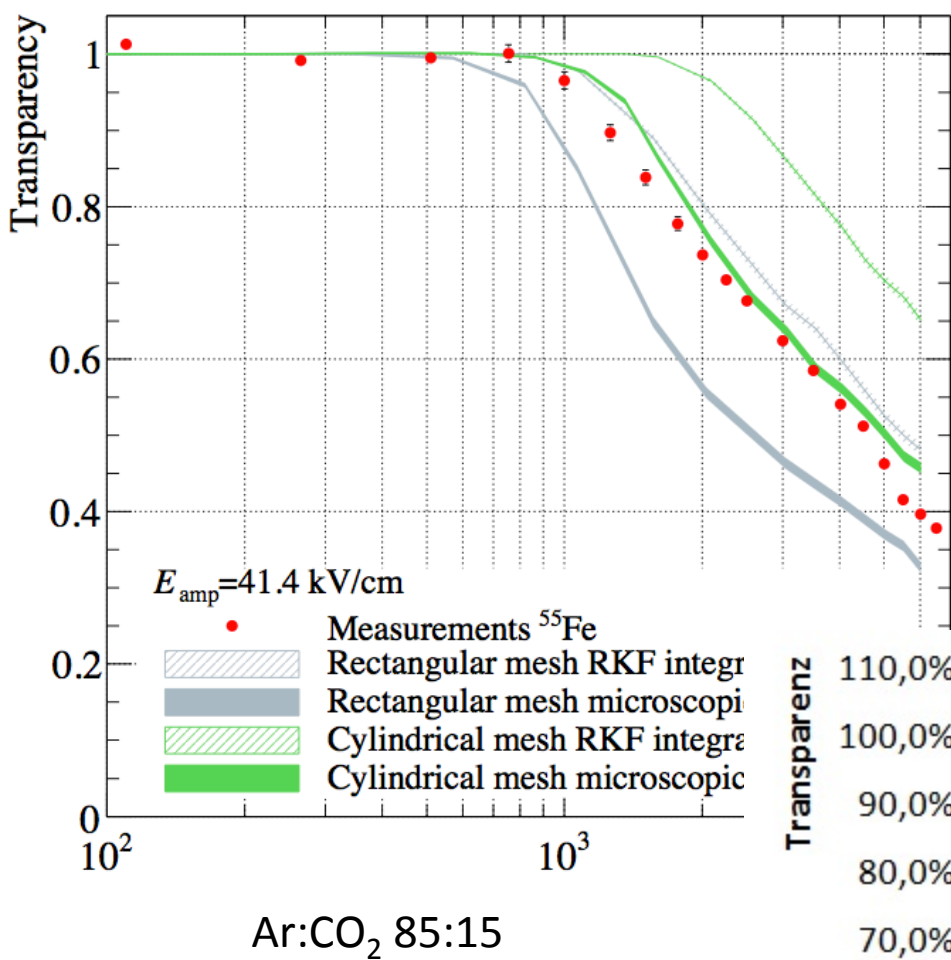


Figure 11: 17/12/13, rev. 1.0/0.0, 10/10/13, 10/10/13, 10/10/13

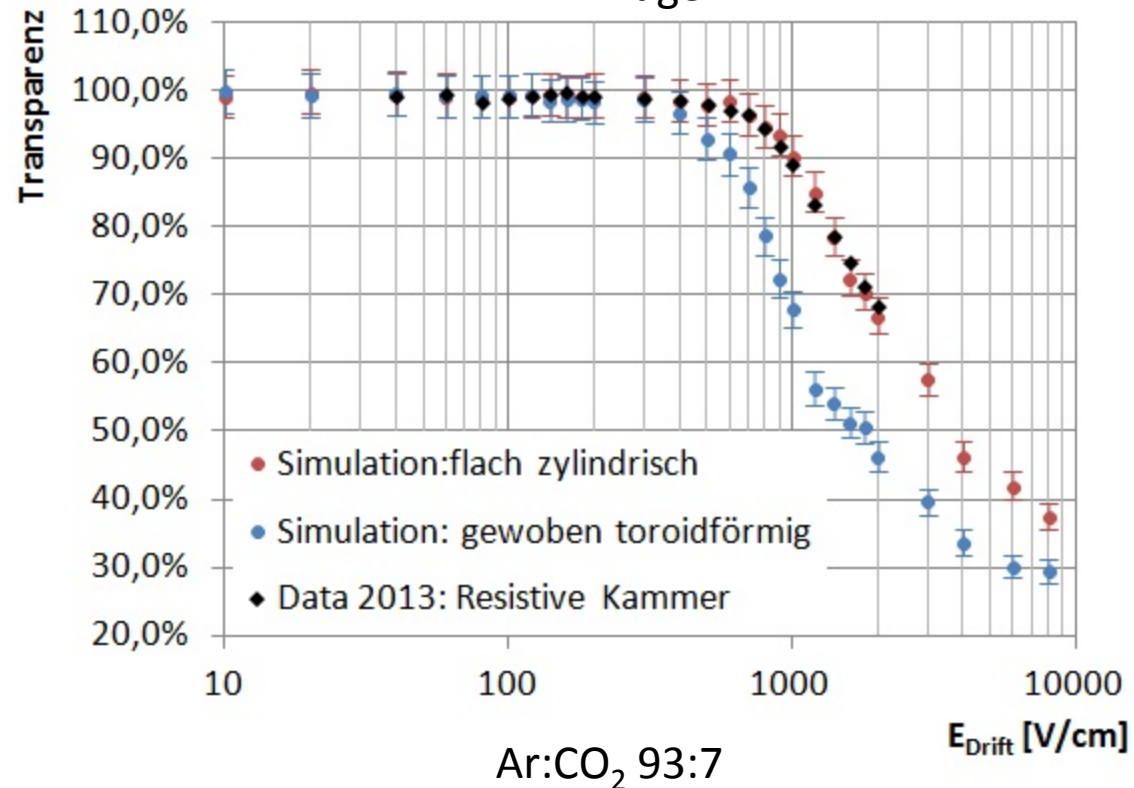
- Typically a few sparks/s for gain 10^4
- About 4x more sparks with 80:20 than with 93:7 Ar:CO₂ mixture
- Neutron interaction rate independent of gas
- Spark rate/n is a few 10^{-8} for gain 10^4

Electron Transparency

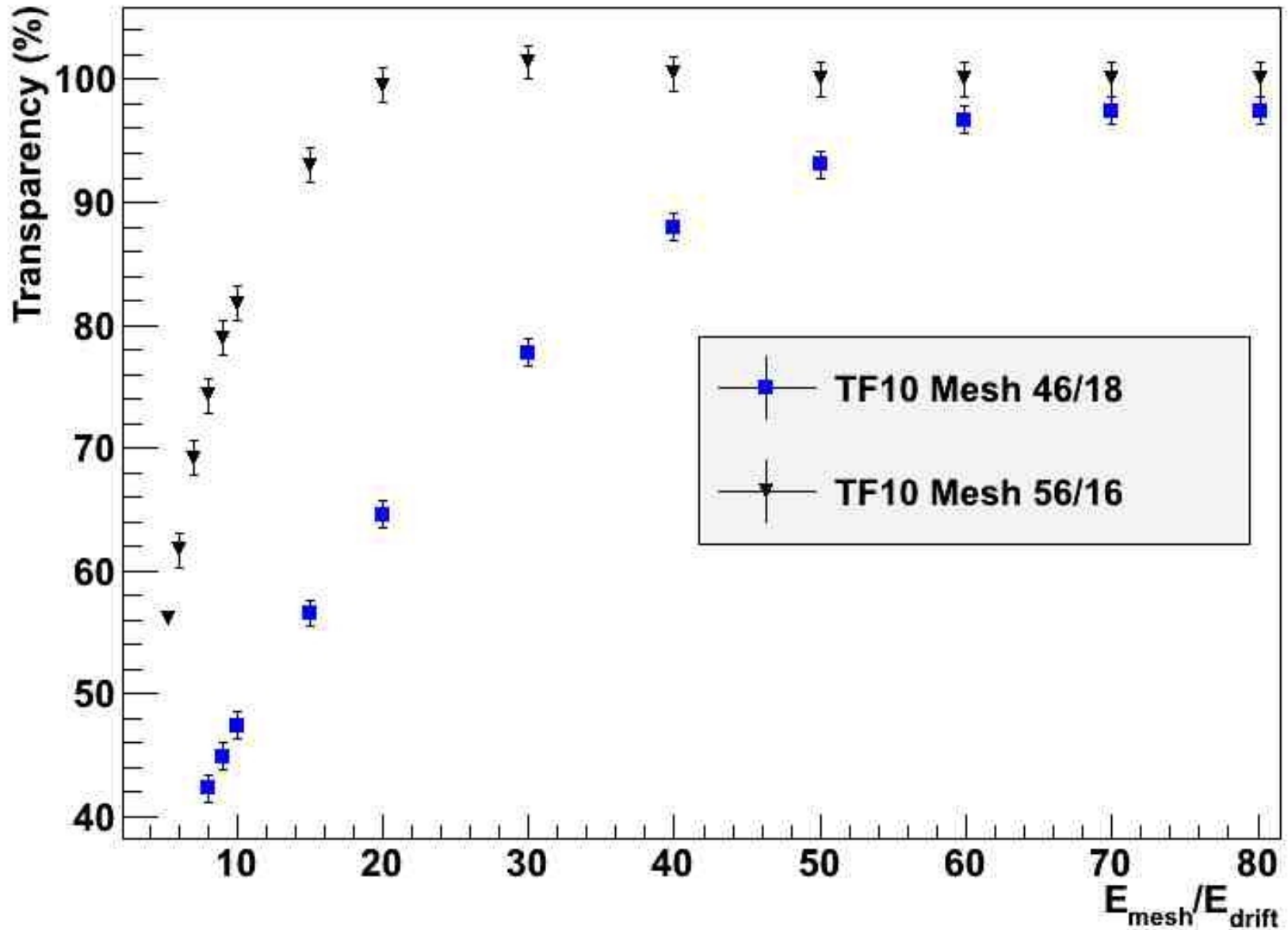
K. Nikolopoulos
Thesis



F. Kuger



Saclay CLASS12 group



Future: Tests on small (10x10) prototypes

- A number of tests on beam on small prototypes can be useful to study different working conditions of the detector:
 - Gas composition
 - Drift velocity
 - Working point
 - Transparency
 - Lorentz angle
- Those studies are not urgent → can wait for the SPS
- Easier to be performed on our standard test area in H6 from end of 2014 to 2015

R12, R13 Gain for 93:7 and 85:15 Ar:CO₂ (⁵⁵Fe source, E_{drift} constant)

