

Zagreb GEM experimental setup

Zagreb-Budapest meeting on LHC physic

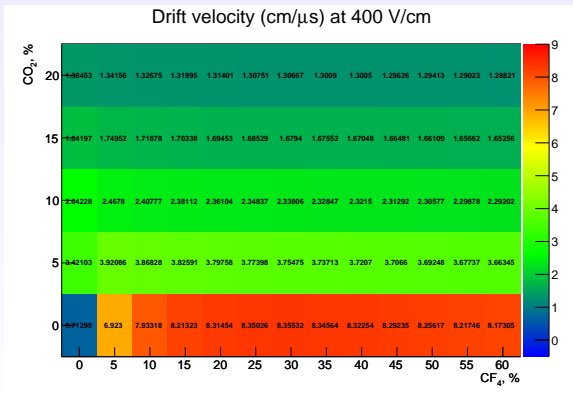
April 24, 2014.

Outline

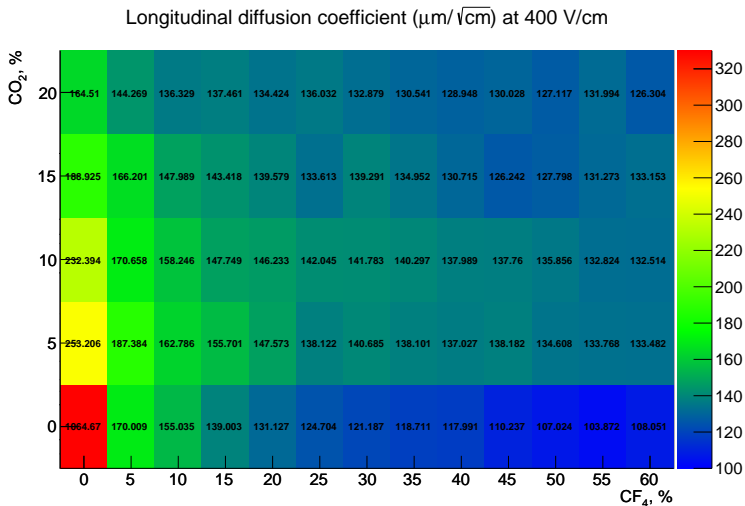
- Investigation of Ne-CO₂-CF₄ mixtures properties
 - Drift velocities
 - Diffusion coefficients
 - Townsend minus attachment
- Equipment that has been ordered
- Experimental setup at University of Zagreb

Drift velocities

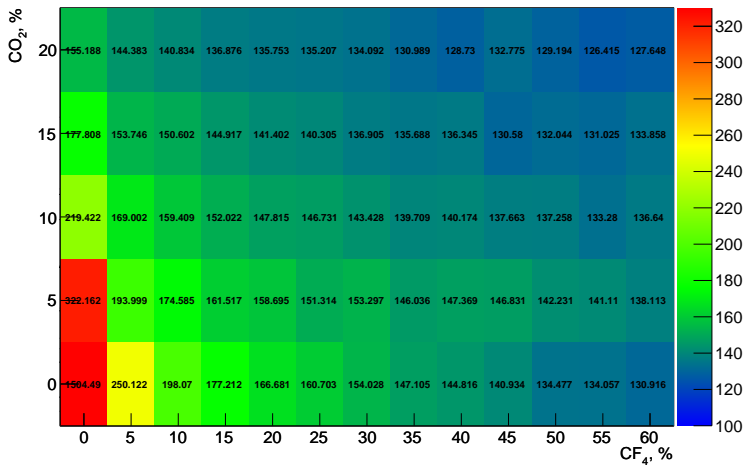
- Mixtures Ne-CF₄ show very high drift velocities.
- Mixtures with any amount of CO₂ have smaller drift velocities.
- Increase of CF₄ concentration does not have significant impact on the drift velocity of these mixtures.



Diffusion coefficients

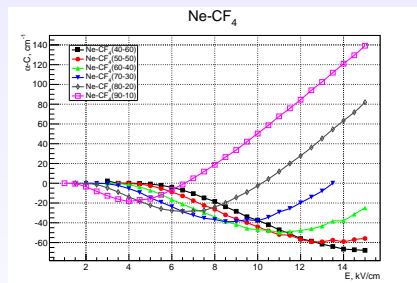


Transverse diffusion coefficient ($\mu\text{m}/\sqrt{\text{cm}}$) at 400 V/cm

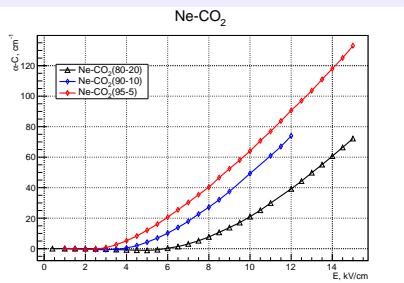


Townsend minus attachment

Ne-CF₄ mixtures

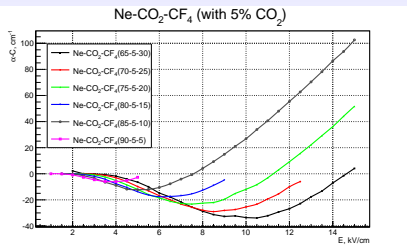
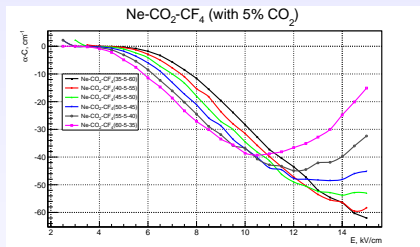


Ne-CO₂ mixtures



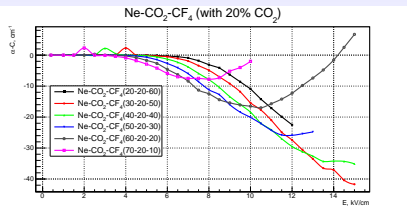
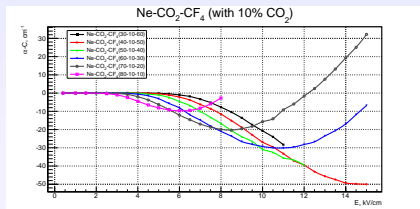
- Ne-CF₄ mixture with smallest concentration of CF₄ show start of negative $\alpha-C$ at electric field around 2kV/cm.
- As concentration of CF₄ increase start of attachment is shifted to larger E-fields.
- In Ne-CO₂ mixtures with smaller concentration of CO₂ positive $\alpha-C$ starts at lower fields.

Townsend minus attachment



- There is similar behavior for mixtures with Ne-CO₂-CF₄.
- Mixture with 5% CO₂ and smallest concentration of CF₄ starts showing attachment around 2kV/cm.

Townsend minus attachment

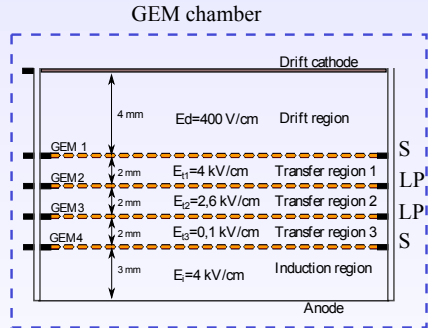


- Ne-CO₂-CF₄ mixtures with 10% CO₂ and smallest concentration of CF₄ start showing attachment at field around 2.5 kV/cm.
- Ne-CO₂-CF₄ mixture with 20% CO₂ and smallest concentration of CF₄ starts showing attachment at field around 3.5 kV/cm.

- Ne-CF₄ mixtures show high drift velocities.
- Drift velocity is significantly decreased with any addition of CO₂ to these mixtures.
- Fast mixtures with no attachment in the relevant region can still be obtained with high concentrations of CF₄ and without CO₂.

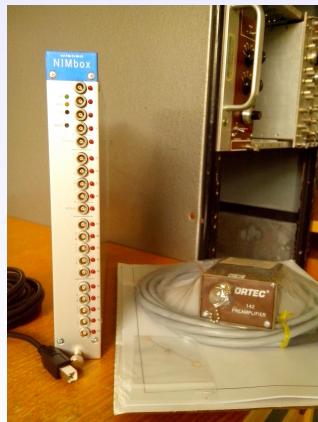
GEM chamber

- GEM chamber and foils ordered from CERN
- Next week assembly and testing GEMs



HV supply and signal readout

- ORTEC 142IH
- Caen N968 Spectroscopy amplifier
- NIMBox NDL8 N
- HV supply for cathode and GEM electrode
 - Iseg 8060n_105
 - Iseg 8080n_105 module
 - Wiener Mpod mini high voltage crate
- Keithley picoammeter 6485



Experimental set-up

