Gaseous Detectors Lectures

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Topics for lecture 1

- Brief introduction (as reminder) of the fundamentals of gaseous detectors
  - Ionization, drift, diffusion, amplification modes (avalanche, streamer, geiger) vs gas mixtures
  - aging/discharge, rate limitation vs gas mixtures
  - principles of signal detection

- Examples of classical devices and their evolution:
  - streamer chambers, MWPC, Large Volume Drift Chambers, large TPC with different reaodut (mwpc readout, mpgd reaodut) …
  - low mass DCH components (single sense wire open cell, multiwires cells, jet-like cells, new single sense wire)
  - Argon vs Helium based gas mixtures
  - mechanics and electronics evolution
  - future prospects

Topics for lecture 2 - MPGD

- **Motivations for MPGD:** MWPC rate limitations, construction complexity
- **MSGC**: operation, long term operation and discharge (main issue of MPGD)
- **Micromegas**: operation and performance, ageing, discharge and breakdown, toward resistive MM, applications - Compass, T2K, ATLAS …
- **GEM**: operation and performance, ageing, discharge and breakdown, applications - Compass, LHCb, KLOE2 (CGEM), TOTEM, CMS (U2 - muon), ALICE TPC
- **2nd generation MPGD**: micro-RWELL, RPWELL, pixel MM, PICOSEC detector
- Manufacturing Technology of MPGD

Topics for lecture 3 - resistive gaseous detectors

- Motivations for introducing resistive elements in gaseous detectors: advantages and drawbacks
- Applications of resistive gaseous detectors in past, present and future experiments: L3, BaBar, CMS, ATLAS, experiments at FCCee and FCChh
- State of the art of resistive gaseous detectors: operation and performance, ageing, eco-friendly gas mixtures
- Toward the next generation of resistive gaseous detectors: frontiers and challenges in rate capability, spatial and temporal resolution, large area coverage

Proposal for the speakers

- Lecture 1: Franco Grancagnolo (INFN Lecce)

- Lecture 2: Gianfranco Morello (INFN Frascati)

- Lecture 3: Marcello Abbrescia (Università di Bari e INFN)