



Contribution ID : 104

Type : Oral presentation

## Upgrade of the ALICE Time Projection Chamber for High-Rate Experiments

*Friday, 4 July 2014 15:50 (20)*

ALICE at the CERN LHC is planning a major upgrade of the central barrel detectors to cope with an increase of the LHC luminosity in Pb-Pb after 2018. The goal is to record Pb-Pb interactions at a rate of 50 kHz after Long Shutdown 2 (LS2), which is a factor of about 100 more than the current data acquisition rate. For the Time Projection Chamber (TPC) this implies replacement of the existing MWPC-based readout chambers by continuously operated Gas Electron Multiplier (GEM) to overcome the rate limitations imposed by the present gated readout scheme.

An extensive R&D program has been launched to reach the challenging goals of the upcoming upgrade of the detector and online calibration and data reduction system. As a first step of this program, a prototype of an ALICE Inner Read-Out Chamber (IROC) was equipped with large-size GEM foils as amplification stage to demonstrate the feasibility of this solution.

In this presentation the most recent results will be discussed concerning ion backflow suppression, gain stability, energy and  $dE/dx$  resolution, stability against discharges. The status of the upgrade of the online calibration and data reduction system, which includes advanced techniques for online corrections of space-charge distortions, as well as the development of a new readout electronics will be also reported.

### Summary

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**Session Classification** : Detector RD and Performance

**Track Classification** : Detector RD and Performance