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# SEMINARI

DATA: 17-18 Giugno 2015  
ORE: 16.00  
LUOGO: Aula Anni  
RELATORE: Dott. Michele Bianco (CERN)  
TITOLO: **"Micromegas Detectors"**  
**"New Small Wheels (NSW)"**

## ABSTRACT: : **"Micromegas Detectors"**

Micromegas Detectors (MMs) are Flexible and wide spread devices with optimal performances for the next generation High Energy Physics experiments. Very good position resolution, high rate capability and radiation tolerance, low material budget, cost effective large instrumented surfaces and low energy threshold are the key features of MMs. Different technologies and materials are entering into this field, providing new possibilities for future detectors. The first part of the seminar will treat motivations and ideas behind the development of MMs detectors.

We will go through the R&D path in between the first MMs prototypes and the ones currently used or foreseen for future upgrades or experiments. This path will be used to emphasize performances and issues, intrinsically related to this technology, and the way they have been used and achieved (performances) or faced (issues). Already in operation MMs and future solutions will be used as examples during the talk. An overview of the MMs application in to the ATLAS experiment for the upgrade of the Muon Spectrometer in the forward regions will conclude the talk.

## **"New Small Wheels (NSW)"**

Over the next decade, the LHC instantaneous luminosity is expected to reach up to 5 times the design value of  $10^{34} \text{ s}^{-1} \text{ cm}^{-2}$  in connection with



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the HL-LHC upgrade program. In parallel to the LHC upgrade, the ATLAS detector will undergo an extensive upgrade program, in order to cope with the increase in rates and particle flux, and to preserve the excellent performance of run-1 also for the challenging high luminosity regime.

The largest upgrade activity for the Muon Spectrometer is the replacement of the innermost stations of the endcaps with the New Small Wheels (NSW), to be installed in the 2018/19 LS2 shutdown. The NSWs consist of eight layers each of Micromegas and small-strip Thin Gap Chambers (sTGC), both providing trigger and tracking capabilities, for a total active surface of more than 2500 m<sup>2</sup>. It represents the first system with such a large size based on Micro Pattern (Micromegas) and wire detectors (sTGC).

This seminar will give an overview over the motivation for the NSW upgrade, and discuss the chosen detector technologies. Detector performance, chamber construction, prototype results as well as the architecture of the NSW electronics will be described. The talk will further cover the challenges of the NSW mechanical design, and present the current status of the project.