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ATLAS status report

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CMS Status Report

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LHCb status report

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ALICE status report

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TBA
Vector Boson Scattering with the ATLAS Detector and EFT prospects

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The diboson production via vector boson scattering is a precisely described process within the Standard Model. It provides access to quartic gauge couplings that could be modified by New Physics. The observation of the electroweak production in the WZ, ZZ, ssWW leptonic channels and the evidence of the electroweak production in the Zγ in proton-proton collisions is presented. The data collected by the ATLAS detector at the LHC at a center-of-mass energy of sqrt(s)=13 TeV are used, corresponding to either the full integrated luminosity of 139 fb$^{-1}$ collected from 2015 to 2018, or a partial dataset of 36.1 fb$^{-1}$. Prospects for New physics through Effective Field Theories interpretation of these channels will be presented.
Construction and operation of large scale Micromegas detectors for the ATLAS Muon upgrade

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After the forthcoming upgrade of LHC accelerator its luminosity will increase up to $7.5 \times 10^{34}$ cm$^{-2}$s$^{-1}$. That enhance of accelerator’s capability will raise the readout rates as well the background data to unmanageable levels from the existing ATLAS muon spectrometer. To surpass limitations of the present small wheel muon detector an upgrade with a New Small Wheel (NSW) consists of Micromegas (MM) and small-strip Thin Gap Chambers (sTGC) was proposed. The first will be used for precision tracking while the second for trigger purposes. Each wheel will be equipped with 8 small and 8 large sectors and each sector will have a double MM wedge surrounded by sTGC wedges. Each MM wedge is composed of four MM quadruplets.

The MM detectors for the NSW will be the largest developed Micro Pattern Gaseous Detector (MPGD) as they will cover an area up to 1280 m$^2$. Custom materials (e.g PCBs, mesh) as well special construction techniques have been used in order to construct these detectors. In this talk an extended description of the production procedures which used during the construction of drift panels for the MM detectors at Aristotle University of Thessaloniki construction laboratory will be given. Furthermore, first results from validation via cosmic tests at CERN, of the final MM wedges will be presented. Efficiency, resolution and gain response are some of the studied aspects which will be discussed.

PICOSEC Micromegas: Achievements in Precise Timing and Recent Advancements with Large Segmented Prototypes

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Emerging challenges in current and future accelerator facilities have set stricter requirements on the timing and rate capabilities of particle detection systems. The PICOSEC Micromegas detector has proven to time the arrival of Minimum Ionizing Particles with a sub-25 ps precision. Driven by a phenomenological model, which describes stochastically the dynamics of the signal formation, new PICOSEC designs were developed that improve significantly the timing performance of the detector. As an example, PICOSEC prototypes with reduced drift gap size (∼119 μm) reached a resolution of 45 ps (in comparison to 76 ps of the standard PICOSEC prototype) in timing single photons in laser beam tests.

Aiming for large area detectors, a multi-pad PICOSEC prototype with a segmented anode has been developed. Extensive tests in particle beams revealed that the multi-pad version of the PICOSEC, offers comparable time resolution with the single-pad detector, even when the MIP induced signal is shared among several neighboring pads. The RD51 PICOSEC collaboration focuses in advancing scalable, radiation hard, resistive PICOSEC Micromegas detectors for very precise timing, by evaluating new thin-gap Micromegas designs, new photocathode materials, resistive anode technologies as well as digitization electronics. An overview of the above mentioned results and activities will be presented.
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New

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