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Understand ATLAS NSW Thin Gap Chamber from Garfield Simulation

In order to profit from the high luminosity and high energy runs of the LHC, the ATLAS collaboration plans to upgrade the present endcap small wheel muon spectrometer to improve the muon triggering as well as precision tracking. The New small wheel (NSW) detector will be composed of eight layers of MicroMegas (MM) detector and eight layers of small-strip Thin Gap Chamber (sTGC). The primary trigger information will be provided by the sTGC detector, thus a good understanding of its performance is extremely important.

In this talk, we focus on the Garfield simulation of the sTGC detector to understand its timing, charge production, charge spread inside the chamber and on the readout strips. Comparison between Garfiled simulation and beam test data are also shown. We also studied the sTGC timing and spatial position resolution under different magnetic fields and high voltages. These studies provide important guide lines for the sTGC detector and electronics development.

Primary author: CURATOLO, Maria (Istituto Nazionale Fisica Nucleare (IT))

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