

Operation of Gossip with a DME/CO₂ mixture

The gaseous pixel detector Gossip is being developed for operation at the upgraded ATLAS b-layer (phase II) at the planned sLHC. In this environment particle rates may be as high as 0.9 GHz/cm² while a dose of $3.4 \cdot 10^{16}$ MIPs/cm² is expected for the intended integrated luminosity of 3000 fb⁻¹.

To operate in this environment, Gossip has a very narrow drift space (1 – 1.5 mm) and a fine granularity (60 x 60 μm) pixel chip. In addition each pixel cell has a TDC to provide Z information from the measured arrival time. The gas amplification is done by a Micromegas foil that is integrated with the pixel chip (InGrid).

In the Gossip concept, individual electrons in the drift space are detected as space points through which a track is fitted.

Results of two recent test beam experiments with a Gossip telescope will be presented. The telescope consisted of two Gossips and a reference chamber with 2 cm drift space. The tests were done with an Ar/iC₄H₁₀ 80/20 mixture and a DME/CO₂ 50/50 mixture. The latter mixture combines an extremely low diffusion with a small Lorentz angle and a high cluster density. The test beam results indicate agreement with simulated values like a position resolution in the 15 μm range, 99% track detection efficiency and a high angular resolution of the track fitted through the measured space points in a single Gossip.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

More information on the concept of Gossip for use in the upgraded sLHC b-layer (phase II) is found in the recently appeared ATLAS note ATL-P-MN-0016 which is stored in EDMS under: <https://edms.cern.ch/file/808572/1/GossipBackupNoteV2-2.pdf>

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