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Trend and new developments in gas amplifiers

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A centenary after the discovery of the basic principle of gas amplification, gaseous detectors are still the first choice whenever the large area coverage and low material budget is required. The introduction of the Multi-Wire Proportional Chamber by G. Charpak 1968 represent one of the glories moment in the history of gas detector (Nobel price in 1992), for it provided for the first time fine space resolution and it revolutionized the field of position-sensitive detectors. Over the past two decades advances in photo-lithography, microelectronics and printed-circuit board (PCB) techniques triggered a major transition in the field of gas detectors from wire structures to the Micro-Pattern Gas Detector (MPGD) concepts. In particular the Gas Electron Multiplier (GEM), the Micro-Mesh Gaseous Structure (Micromegas), and more recently other micro pattern detector schemes, offers the potential to develop new gaseous detectors with unprecedented spatial resolution, high rate capability, large sensitive area, operational stability and radiation hardness. In the present contribution we will briefly overview the historical roadmap of gaseous detector development and we will discuss basic concepts, operational mechanisms and performance of the most popular new gas amplifier structures.

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