

From (very) basic ideas to complex gaseous detector systems

Since long time, the compelling scientific goals of future high-energy physics experiments were a driving factor in the development of advanced detector technologies. A true innovation in detector instrumentation came in 1968, with the development of a fully parallel readout for a large array of sensing elements – the Multi-Wire Proportional Chamber (MWPC), which earned Georges Charpak a Nobel prize in physics in 1992. Over the years, the basic principles of charge-avalanche multiplication in gas media have evolved. While the ionization electrons deposition and drift towards an amplification element remained, the latter has followed over the years a dramatic evolution - often driven by the working conditions of large collider experiments. In the new approaches, wires, typically used in MWPC, Drift Chambers and Time Projection Chambers (TPC), have been replaced by Micro-Pattern Gaseous Detectors (MPGD) created by advanced photolithographic techniques. MPGDs have become a well-established technique in the fertile field of gaseous detectors; these will remain the primary choice whenever the large-area coverage with low material budget is required. This lecture will present recent highlights from gaseous detectors domain and summarize recent advances from the CERN-RD51 and CERN-DRD1 collaborations.