Contribution ID: **5** Type: **not specified**

From (very) basic ideas to complex gaseous detector systems

Tuesday 15 November 2022 09:00 (45 minutes)

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 concepts 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. Since that time radiation detection and imaging with fast gaseous detectors, capable of economically covering large detection volumes with low mass budget, have been playing an important role in many fields of physics. Advances in photolithography and microprocessing techniques in the chip industry during the past decade triggered a major transition in the field of gas detectors from wire structures to Micro-Pattern Gaseous Detector (MPGD) concepts, revolutionizing cell-size limitations for many gas detector applications. Novel structures where MPGDs are directly coupled to the CMOS pixel readout represent an exciting field allowing timing and charge measurements as well as precise spatial information in 3D. Originally developed for the high-energy physics, MPGD applications have expanded to nuclear physics, photon detection, astroparticle and neutrino physics, neutron detection, and medical imaging.

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