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Industrialization of Resistive Plate Chamber Production

Resistive plate chambers (RPCs) with electrodes of high-pressure phenolic laminate (HPL) and small gas gap widths down to 1 mm provide large area tracking at relatively low cost in combination with high rate capability and fast response with excellent time resolution of better than 500 ps. These chambers are perfectly suited for experiments requiring sub-nanosecond time resolution and spatial resolution on the order of a few millimeters over large areas. Thin-gap RPCs will therefore be used for the upgrade of the barrel muon system of the ATLAS experiment at HL-LHC and are candidates for the instrumentation of future collider detectors and for experiments searching for long-lived particles in experiments. RPCs are also frequently used in large area cosmic ray detectors. The large demand for RPCs exceeds the presently available production capacities. At the same time, the requirements on mechanical precision, reliability and reproducibility for collider detectors have increased. Additional suppliers with industry-style quality assurance are urgently needed. We have established RPC production procedures compliant with industrial requirements and are in the process of certifying several companies for RPC production for the ATLAS upgrade for HL-LHC and beyond. We will report about the technology transfer, the RPC prototype production at the selected companies and the results of the certification procedure.

Primary experiment

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Track Classification: Gaseous Detectors