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The ALICE Transition Radiation Detector: Chamber manufacturing, system integration and tracking tests

The Transition Radiation Detector (TRD) is one of the main detector elements of the ALICE experiment at LHC. It is intended to serve for electron identification over the expected large background of pions, enhancing signal to background e.g. for J/Ψ by a factor of 20. The six layer concentric detector barrel design additionally serves to enhance the overall tracking capability of the ALICE tracking system. The TRD covers 20° in azimuth and matches the coverage of the other central barrel detectors of ALICE along the beam axis. The TRD barrel measures 7 m long and 7 m in diameter. It is divided into 18 super-module angular sectors, consisting of 30 TRD drift chambers (MWPC) and integrated readout electronics each. The TRD will collect data from 1.2 million individual readout pads. Data is processed by on-detector analogue and digital electronics with the capability to reconstruct tracks on-line and provide a trigger on high-momentum electrons within six microseconds. To date, 60% of the TRD wire chambers have been manufactured. The first complete super-module has been assembled, tested with cosmic rays and is already installed in the ALICE setup. This publication will give an outline of the TRD system concept. Further, it will focus upon chamber manufacturing, system integration and tests performed with the first super-module.

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