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Performance of the ATLAS Transition Radiation Tracker

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Please give a brief summary of your poster

A central component of modern collider experiments is the detection of charged particles and the reconstruction of their trajectories and momenta. The ATLAS experiment is designed to operate under the challenging conditions from high energy proton collisions at extremely high instantaneous luminosities at the CERN Large Hadron Collider. The ATLAS charged particle tracking system includes a transition radiation tracker, which consists of 350,000 straws of radius 2 mm filled with a Xenon-C02 gas mixture. For charged particles with pseudo-rapidity below 1.6, approximately 35 measurements of the trajectory are provided between 0.5 m and 1.1 m in radius from the axis defined by the proton beam. Electron identification is provided by detection of transition radiation, which is excited from high velocity particles when they pass through the many polymer fibers that fill the spaces between the straws. The transition radiation is absorbed by the Xenon gas inside the straws, leading to ionization two orders of magnitude larger than expected from the passage of minimum ionizing particles.

In advance of proton collisions, the TRT has been successfully commissioned with data collected from the passage of cosmic ray muons. This poster will present the operational status of the detector, the performance in terms of charged particle track reconstruction, the status of the alignment, and contributions to the ATLAS trigger system. As very high momentum muons can also produce transition radiation, the detection of transition radiation will also be presented as well as the expected improvement in electron identification.

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