

ALICE ITS2 cluster size and PID capability studies

The new ALICE Inner Tracking System (ITS2) detector consists of seven layers of ALPIDE detectors, which include both the sensor and the readout electronics on the same chip. The ITS2 exceeds its predecessor in terms of granularity and material budget, hence with relevant improvements of pointing, momentum, and tracking resolution. In particular, to cope with the large amount of data collected during the current data-taking period (Run 3), the binary digital readout of ITS2 plays a crucial role.

The topology of the signal (cluster) produced by the charged particles traversing the layers is used for tracking and vertexing purposes. Unexpectedly high number of clusters composed of more than 40 pixels has been spotted in the data collected within the first year of Run 3, and their nature has been studied in detail. Furthermore, an inconsistency between the cluster size distribution in the data and MC simulations is observed, especially for these clusters. The data-to-MC agreement can shed light on the origin of large clusters, and the latest results on this topic are presented.

Finally, the particle identification (PID) capability of the ITS2 detector is discussed. Cluster topologies can be interpreted as a proxy for the energy loss by charged particles traversing the ITS2. This information, together with the reconstructed momentum of the particle and its angular distribution, can be used to assess the particle species. The first results on the study of the ITS2 PID capabilities on MC simulation and data are presented.