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The pixel module for the Inner Tracking System upgrade of ALICE at LHC

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The ALICE (A Large Ion Collider Experiment) detector at the CERN LHC collider was designed to address the physics of strongly interacting matter, and in particular the properties of the Quark-Gluon Plasma (QGP) using proton-proton, proton-nucleus, and nucleus-nucleus collisions. Even if with this physics goal a lot of important results were already reached, there are still several fundamental measurements to be finalized, like high precision measurements of rare probes (D, B mesons and Lambda barions decays) over a broad range of transverse momenta. In order to achieve these new results, a wide upgrade plan was approved that combined with a significant increase of luminosity will enhance the ALICE physics capabilities enormously.
The ALICE Inner Tracking System (ITS) upgrade is one of the major improvements of the experimental set-up that will take place in 2019-2020 where the whole ITS sub-detector will be replaced with a new one realized using a innovative CMOS Monolithic Active Pixel silicon Sensor (MAPS), called ALPIDE. This new upgraded ITS will be realized using more than twenty-four thousand ALPIDE chips organized in seven different cylindrical layers surrounding the ALICE interaction point along the beam-line, for a total surface of about ten square meters. The main features of the future ALICE ITS are a low material budget, high granularity and low power consumption. All these peculiar capabilities will allow for full reconstruction of rare heavy flavor decays and the achievement of the physics goals.
In this talk after a description of new ALIPIDE pixel chip and the whole ITS upgrade project, will be presented the construction procedure of the basic building block of the detector, namely the module, and the laboratory characterization of this element.

TRACK

Applications

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