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The ePIC Silicon Vertex Tracker Barrel: design and thermal-mechanical tests

The future Electron Ion Collider (EIC) will offer a unique opportunity to explore the parton distributions inside nucleons and nuclei thanks to an unprecedented luminosity, a wide range of energies, a large choice of nuclei

and polarization of both beams.

The electron Proton-Ion Collider collaboration (ePIC) detector will be capable of precise determination of the position of primary and secondary vertexes, essential e.g. for the identification of charm hadrons, which have typical decay lengths of the order of 100 microns, via topological cuts, giving access to the gluon distribution inside hadrons.

This measurement capability is achieved with a Silicon Vertex Tracker (SVT) placed as the innermost device in the ePIC experiment.

The SVT Inner and Outer Barrel (IB,OB), developed by a collaboration of Italy-UK-USA institutes, provide five detecting layers

made of silicon detectors, using the 65 nm MAPS technology with stitching, pioneered by the ALICE collaboration for the ITS3 upgrade.

The IB main focus is on vertexing performance. It is made of three layers of wafer-scale sensors bent to a cylindrical shape.

The OB, composed of two layers, mainly contributes to the particle momentum measurement and it is equipped with a smaller version of the IB sensor mounted in a typical stave configuration.

The status of the design and results of tests performed on thermal-mechanical mock-ups of the detector will be presented.

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