

The integration of the PANDA Micro-Vertex-Detector

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PANDA is a key experiment of the future FAIR facility, under construction in Darmstadt, Germany. It will study the collisions between an antiproton beam and a fixed proton or nuclear target. The Micro Vertex Detector (MVD) is the innermost detector of the apparatus and its main task is the identification of primary and secondary vertices. The central requirements include high spatial and time resolution, trigger-less readout with high rate capability, good radiation tolerance and low material budget.

To meet these requirements, the detector will be composed of four concentric barrels and six forward disks. The inner layers will be instrumented with silicon hybrid pixel detectors, while for the outer two barrels and for the outer part of the last two disks double-sided silicon microstrip detectors were chosen.

Because of the compact layout of the system, its integration poses significant challenges. The detectors will be supported by a composite structure of carbon fiber and carbon foam, which will ensure the precise positioning of the sensitive elements while keeping the material budget low. A water-based cooling system embedded in the carbon mechanical supports will be used to remove the excess heat from the readout electronics. The fixed target setup of the experiment requires all the services to be routed in the backward direction, traversing the sensitive volume. The use of light aluminum cables and busses for power and data transmission within the detector has been therefore studied to minimize the impact of the cabling on the material budget.

In this contribution the design of the detector and the ongoing development of the hardware components related to its integration will be presented.

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