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Integration of the strip detector of the PANDA Micro-Vertex-Detector (PANDA)

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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. In the strip part of the detector, the sensors and the readout electronics 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. A flexible multilayer bus will be used to route the signals on the stave towards the DAQ system. The design of the detector, its integration concept and some relevant hardware developments will be presented.

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