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Construction of the Forward Endcap Calorimeter of the PANDA Experiment at FAIR

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PANDA is the main hadron physics addressing experiment of the future FAIR (Facility for Antiproton and Ion Research) center at Darmstadt, Germany. Located at the HESR antiproton storage ring the PANDA detector is optimized for physics of the weak and strong interactions in the charm sector: Search for new and exotic states of matter, precise determination of quantum numbers, masses and widths of hadronic resonances and deeper insights in the structure of hadrons.

The detector consists of a target spectrometer build around the interaction region of antiprotons carrying momenta of 1.5-15 GeV/c with a fixed hydrogen target and a forward spectrometer. Its design is based on compactness and cost saving while achieving high resolution, rate capability and physics selectivity.

In the PANDA target spectrometer the electromagnetic calorimeter is composed of three subdetectors based on at -25 degrees C operated lead tungstate crystals. A barrel structure build from 11360 crystals will be closed in up- and downstream direction by two endcaps containing 524 and 3856 crystals, respectively. After intense beam test phases with a 200 crystal forward endcap prototype the required performance was shown to be met and the design finished. The upstream located forward endcap is currently under construction. Besides the overall mechanical design and cooling concept the 16-crystal submodules series manufacturing and quality assurance measures will be presented.

Secondary topics

Applications

Primary topic

Other

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