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The Electromagnetic Calorimeter for the PANDA Target Spectrometer

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The future PANDA experiment features a next generation detector. Measurements will focus on hadron spectroscopy. PANDA will use cooled anti-proton beams with momenta between 1.5 GeV/c and 15 GeV/c interacting with various targets. This allows to populate directly states of all quantum numbers and to measure their widths with accuracies of a few tens of keV. The experiment will be located at the Facility for Anti-proton and Ion Research in Germany, which is currently under construction.

The electromagnetic target calorimeter of the PANDA experiment has the challenging aim to detect high energy photons with excellent energy resolution over the full dynamic range from 15 GeV down to a few tens of MeV within a 2T solenoid. To reach this goal, improved PbWO₄ scintillator crystals, cooled down to -25°C have been chosen. They provide a fast decay time for highest count rates, short radiation length for compactness, improved light yield for lowest thresholds and sufficient radiation hardness.

The target calorimeter itself is divided into a barrel and two endcaps. The individual crystal will be read out with two precisely matched large area avalanche photo diodes. In the most inner part of the forward endcap vacuum photo-tetrodes will be used.

The talk will give an overview of the PANDA experiment and focuses on its target calorimeter including the scintillator material and the production status. Furthermore, the design, construction and assembly procedure of the barrel part will be discussed in detail.

Secondary topics

Instrumentation, Front-end readout

Applications

Design concepts for future calorimeter at the energy frontier

Primary topic

Scintillators

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