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Test beam study of the PANDA Shashlyk calorimeter prototype

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Summary

The physics program of the PANDA project at the international FAIR facility at GSI (Germany) is based on a state-of-the-art universal detector for strong interaction studies at high intensity cooled antiproton beam with an energy up to 15 GeV. This program relies heavily on the capability to measure photons with excellent energy and position resolution. For this purpose PANDA has proposed to employ electromagnetic calorimeters using two different technologies: a compact calorimeter around the target based on lead tungstate crystals and a fine-segmented Shashlyk-type calorimeter in the forward region.

The Shashlyk calorimeter prototype for the PANDA experiment has been constructed

at IHEP and experimentally tested using the 1-19 GeV electron beam with high precision momentum tagging at the IHEP accelerator. Results of the first measurements for the fine-segmented Shashlyk calorimeter prototype in the wide energy

range up to 19 GeV are presented. Two cell sizes ($5.5 \times 5.5 \text{ cm}^2$ and $11 \times 11 \text{ cm}^2$) were

used in the prototype. Fair energy and position resolutions having been obtained are in a good agreement with the Monte-Carlo simulations. Detection inefficiency due to holes for straight light fibers has turned out to be negligible for PANDA. The results of the Monte-Carlo study of π^0 reconstruction for the both cell size prototypes are also presented in front of an approaching test beam study of this.

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