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The electromagnetic calorimeter of the PANDA detector at FAIR

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The versatile 4π-detector PANDA will be built at the Facility for Antiproton and Ion Research (FAIR), an accelerator complex, currently under construction near Darmstadt, Germany. A cooled antiproton beam in a momentum range of 1.5 – 15GeV/c will be provided by the High Energy Storage Ring (HESR). All measurements at PANDA rely on an excellent performance of the detector with respect to tracking, particle identification and energy measurement. The electromagnetic calorimeter (EMC) of the PANDA detector will be equipped with 15808 PbWO4 crystals (PWO-II), which will be operated at a temperature of −25◦C in order to increase the light output. In this talk especially the design of the forward endcap of the EMC will be shown. The crystals in this detector part will be read out with Large Area Avalanche Photo Diodes (LAAPDs) in the outer regions and with Vacuum Photo Tetrodes (VPTTs) in the innermost part. Production of photosensor units utilizing charge integrating preamplifiers has begun. A prototype comprised of 216 PbWO4 crystals has been built and tested at various accelerators (CERN SPS, ELSA/Bonn, MAMI/Mainz), where the crystals have been exposed to electron and photon beams of 25 MeV up to 15 GeV. The results of these test measurements regarding the energy and position resolution are presented. This work is supported by the BMBF and the EU.

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