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## The Endcap Disc DIRC of PANDA

*Monday 5 September 2016 16:45 (25 minutes)*

A 2 cm thick fused silica plate is the central part of the Endcap Disc DIRC, that has been designed to identify traversing pions, kaons and protons in the future PANDA experiment. The detector has a dodecagonal structure with a diameter of about 2 m. The radiator is segmented into 4 identical quadrants. Its acceptance covers the PANDA forward range of  $5^\circ$  to  $22^\circ$ . Cherenkov light produced by relativistic particles is internally reflected inside the highly polished radiator plates. Focusing optics is attached to the outer rim of the four plates outside of the acceptance of the experiment. It focuses the Cherenkov light onto MCP-PMTs with a pitch of about 0.5 mm. The detector will be able to provide a  $4\sigma$  pion-kaon separation up to 4 GeV/c. A fast readout system will cope with the continuous antiproton beam of PANDA with interaction rates up to 20 MHz.

The current design is the product of a learning curve of several iterations of simulation, prototype development and test beam campaigns. We tested MA-PMTs, SiPMs and MCP-PMTs, using acrylic glass, float glass and fused silica for the optical elements. Considerations of radiation hardness, strong magnetic fields, tight spatial requirements and high count rates lead to the final design using fused silica as optical material and MCP-PMTs with high life time and good time and spatial resolution for single photon detection. A limited spectral acceptance reduces dispersion effects and extends the lifetime of the photo sensors. A compact and fast readout is realized by using ToFPET ASICs. Analytical reconstruction algorithms allow for fast particle identification.

The talk will explain the criteria that lead to the current design and will report on the quality control of the individual components on the test bench, as well as on the results of system tests using test beams and cosmic rays.

### Registered

Yes

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