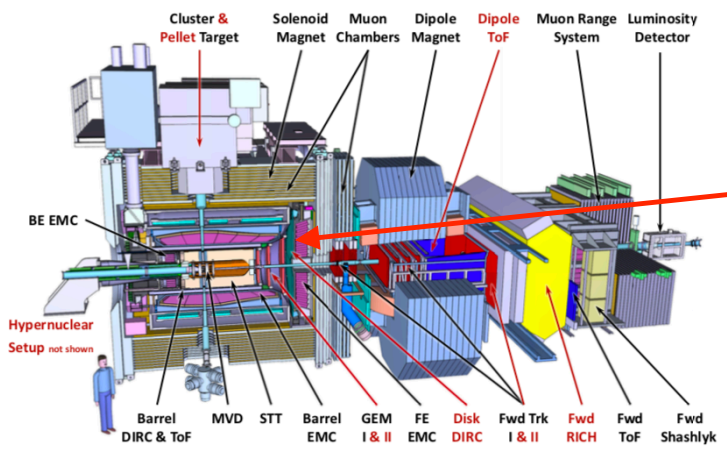
The PANDA EDD prototype in Giessen Cosmic Station

İlknur Köseoğlu-Sarı on behalf of the PANDA Cherenkov Group

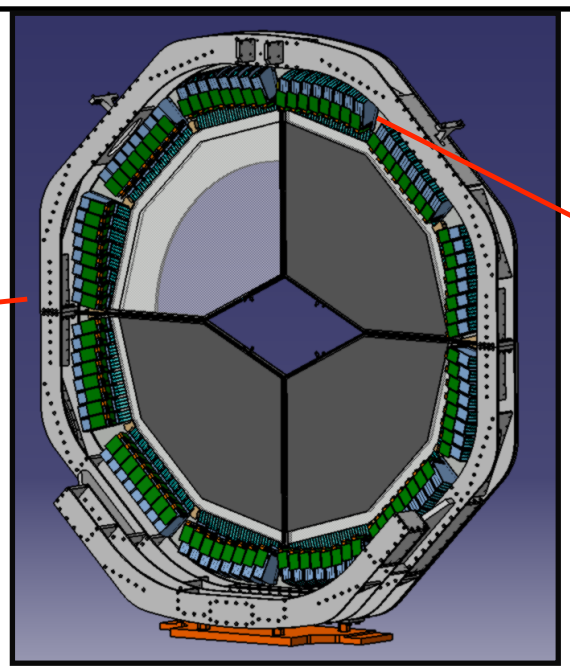
II. Physikalisches Institut, Heinrich-Buff-Ring 16, D-35392 Giessen, Germany

TIPP 2021 Triumf, Vancouver, CA poster_429 **26.05.2021**

PANDA Experiment

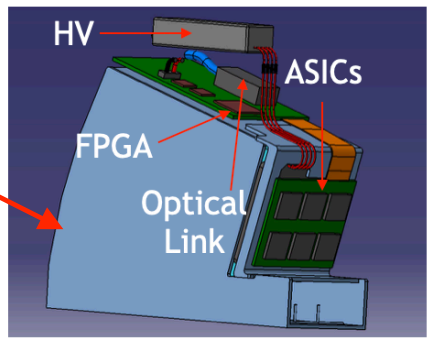


The PANDA experiment is constructed at FAIR/ Germany to measure hadronic QCD processes in proton-antiproton annihilation.



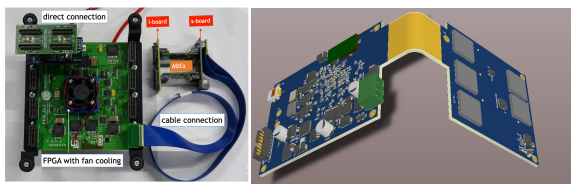
The Panda Endcap Disc DIRC (EDD) uses a quartz radiator with internal total reflection of Cherenkov photons for particle identification.

Readout Module



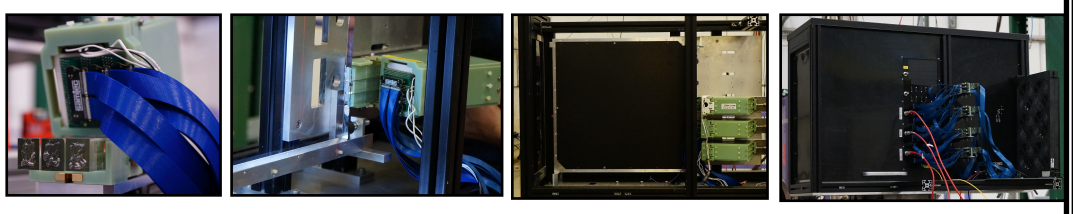
Readout Module (ROM) unit encloses three Focusing Elements (FEL) with an optical bonding to the three bars and a photosensor.

Frontend Electronics

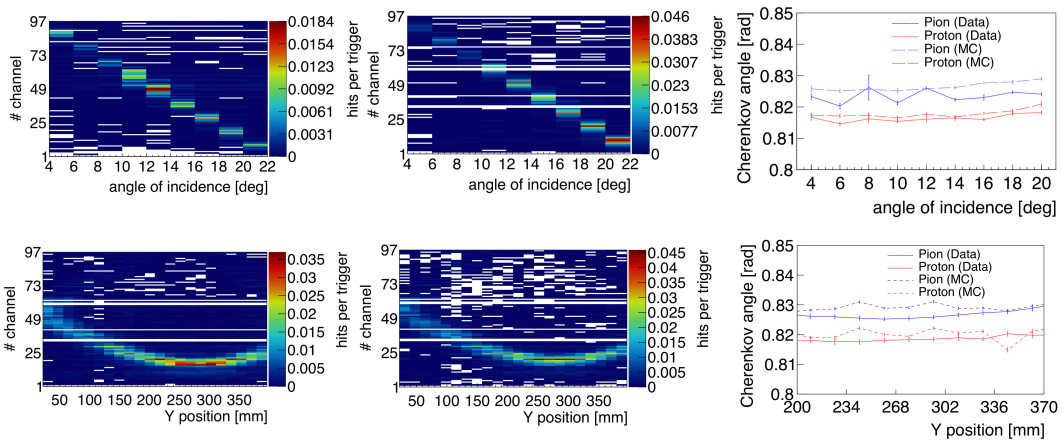


Left: Existing frontend electronics designed by PETsys company for SiPM. It consists of specified modules for positive SiPM signals, ASICs, FPGA and etc.
Right: Future custom design board for the readout of negative MCP-PMT signals.

CERN 2018 Testbeam

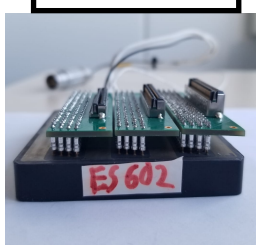


The EDD prototype in a rectangular shape was used for test beam experiments at CERN T9 area in 2018. First: one ROM. Second: One ROM is coupled to the side of the radiator. Third: The prototype with 3 ROMs. Fourth: The prototype in a light-tight box.



Cherenkov photons as a function of position and MCP-PMT channel for pions (left), protons (middle) and compared with MC based GEANT4.

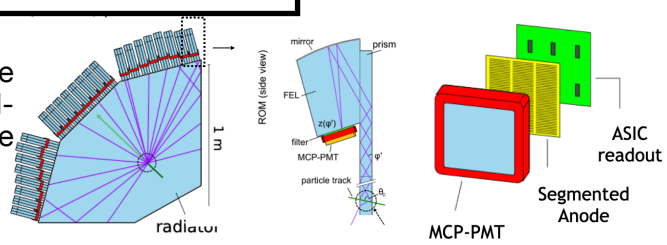
Photo sensor



Side view of the Multi Channel Plate-PMT photosensorwith three adaptor boards connected to the 100x3 pins of the segmented anode.

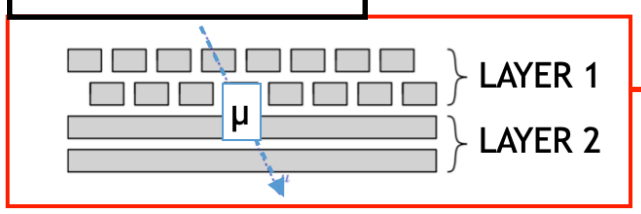
Optical Components

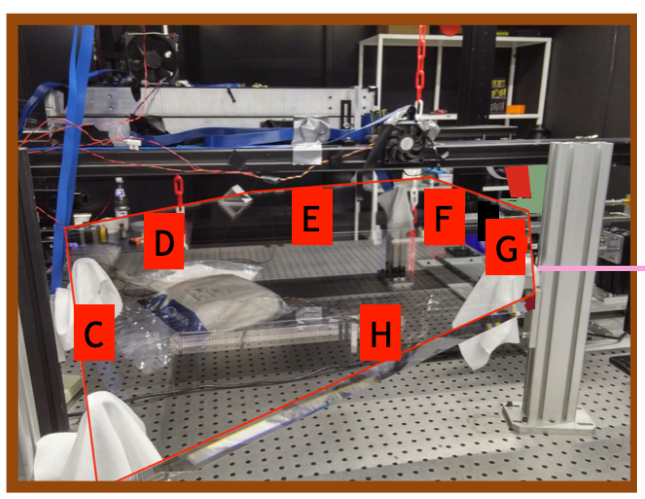
Left: The charged particle (green) traverses the fused-silica radiator and create Cherenkov photons (purple).

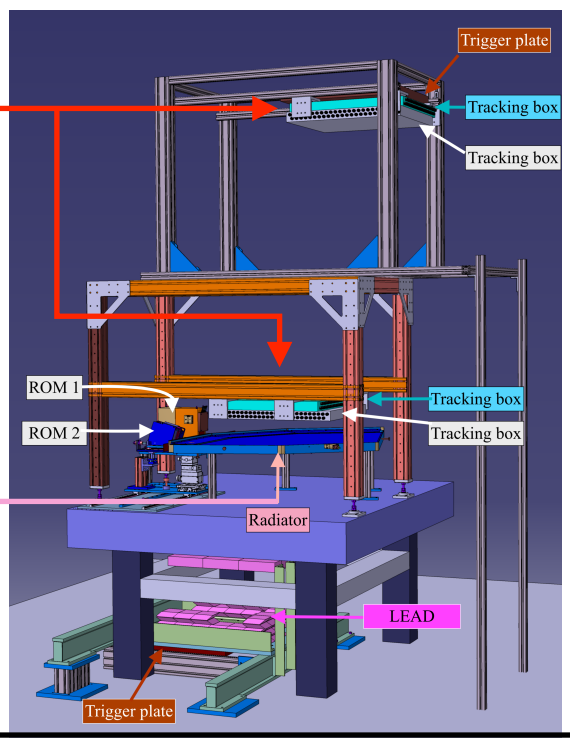


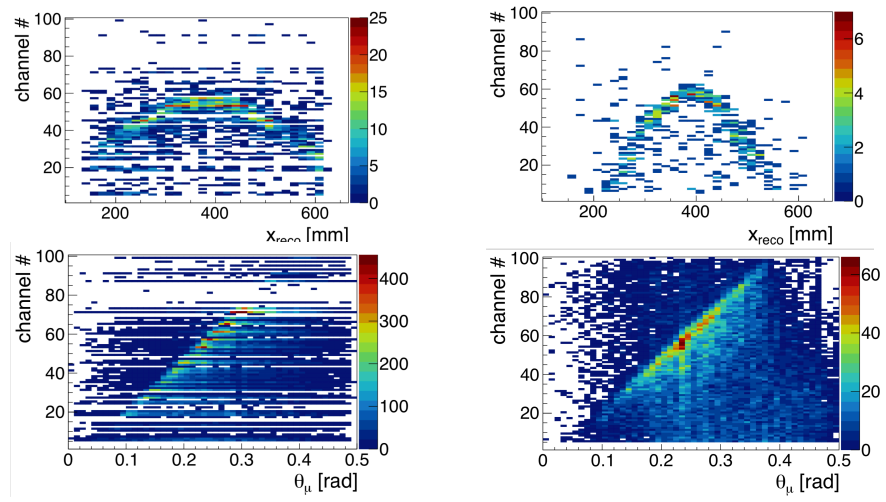
Photons are internally reflected through the outer rim and reach ROM. Middle: One ROM module from the side view. Purple lines represent Cherenkov photons which hits the mirror at the outer edge of the FEL and focused on to the filter. The filtered photons will reach the photosensor. Right: The photo sensor is a microchannel Photo-Multiplier Tube (MCP-PMT) with a highly-granulated anode structure. The readout system will connect to ASIC readout directly.

Giessen Cosmic Station









Giessen Cosmic Station (GCS) is an experimental setup to measure the cosmic muons which traverse the radiator and create Cherenkov photons. Two characteristic patterns of the Cherenkov distributions are shown. Measured Cherenkov photons data (left) and simulated MC (right) results are shown as a function of polar angle and the hit position of the muons. Two prototypes were successfully tested for future use in PANDA experiment.