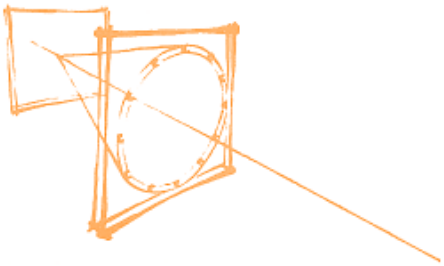

ID de Contribution: **25** Type: **Oral presentation**

Systematic Studies of Microchannel Plate PMTs

mercredi 5 mai 2010 11:05 (30 minutes)

The PANDA experiment at the FAIR facility at GSI in Darmstadt will use the DIRC technique to separate charged pions and kaons. Two devices are planned: a barrel DIRC and a forward disc DIRC detector covering together a polar angle range from 5 to 140 degrees. Since the PANDA detector was chosen to be very compact the image plane of both DIRCs is located inside the solenoid magnetic field of up to 2 T.

Thus the photosensors have to provide a good spatial resolution and have to detect single photons inside a high B-field. To correct for dispersion effects in the radiators a time resolution of better than 100 ps is desirable. Moreover, the interaction rate of 20 MHz inside PANDA leads to photon densities of up to several MHz/cm2 at the sensor's surface. This puts serious constraints on the rate stability and lifetime of these devices. Because of their excellent time resolution, high gain and B-field resistivity microchannel plate (MCP) PMTs are very appealing sensors for the PANDA DIRCs. As multi-anode devices they provide a good active area ratio while still being rather compact in size. In view of the harsh PANDA conditions the rate stability and the lifetime need to be thoroughly investigated.

In a systematic study we have measured the performance parameters of several types of MCP-PMTs. Among others the new Burle-Photonis Planacon 85012 with an improved vacuum and the latest Hamamatsu R10754-00-L4 were tested for their gain (in dependence of magnitude and orientation of a B-field), time resolution and rate stability. Surface scans were performed to investigate the response uniformity and the cross talk among the anode pixels. We have also started to do lifetime measurements: selected MCP-PMTs are illuminated with rate conditions similar to those in PANDA. Special focus is put on the quantum efficiency as a function of the integrated anode charge.

The results of these comprehensive studies will be presented and compared.

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Please indicate ”poster” or ”plenary” session. Final decision will be made by session coordinators.

plenary

Author: LEHMANN, Albert (Universität Erlangen-Nürnberg)

Co-auteurs: BRITTING, Alexander (Universität Erlangen-Nürnberg); UHLIG, Fred (Universität Erlangen-Nürnberg); EYRICH, Wolfgang (Universität Erlangen-Nürnberg)

Orateur: LEHMANN, Albert (Universität Erlangen-Nürnberg)

Classification de Session: Photon detection for Cherenkov Counters - vacuum based devices

Classification de thématique: Photon detection for Cherenkov counters