

## Tracking with Straw Tubes in the $\bar{P}$ ANDA experiment

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The  $\bar{P}$ ANDA spectrometer will be built at the FAIR facility at Darmstadt (Germany) to perform accurate tests of the strong interaction through  $\bar{p}p$  and  $\bar{p}A$  annihilations. The charged particle tracking at  $\bar{P}$ ANDA will be done using both solid state and different gaseous detectors. Among the latter, two straw tube detectors will be built [1]. The cylindrical, central straw tube tracker features a high spatial and momentum resolution in a wide range of particle momenta from about 8 GeV/c down to a few 100 MeV/c, together with a particle identification in the momentum region below about 1 GeV/c by using the specific energy-loss method.

A new technique based on self-supporting straw layers with intrinsic wire tension developed for the COSY-TOF straw tracker [2] has been adopted for the  $\bar{P}$ ANDA trackers. The straw tubes are assembled and the wire is stretched by 50 g at an overpressure of about 1 bar. Then the tubes are close-packed and glued together to planar double-layers. At the gas overpressure of 1 bar the double-layers maintain the nominal wire tension and become self-supporting. The double layers will be then used to instrument either the Central Tracker, which has a cylindrical geometry, and the Forward Spectrometer that is a planar detector. To read out the straw tube signals, a new ASIC is under development. Each ASIC's channel comprises a charge preamplifier stage, a pole-zero cancelation network, a shaper stage, a tail cancelation network, a discriminator circuit, a baseline holder, a fast differential LVDS output and an analog output. The first prototype of this new device has been produced and used to instrument straw tube modules that have been tested with cosmic rays and proton beams. The design issue of the  $\bar{P}$ ANDA straw tubes together with the results of the prototype's tests will be presented.

[1] W. Erni et al., Technical Design Report for the: PANDA Straw Tube Tracker, arXiv:1205.5441, In press on EPJ A;

[2] P. Wintz, in Intersections of Particle and Nuclear Physics: 8th Conference CIPANP2003, AIP Conf. Proc. 698-1, 792 (2004);