PANDA straws: testing plans in Julich.

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Goal: investigations of tracking and particle identification by multiple ionizations measurements;

Testing and optimizing of different types of FEE – preamplifiers, amplifiers-discriminators; digital electronics; gas mixtures;

Plans for coming weeks, work in progress:

assembling of a straw detector prototype for test in laboratory with cosmic rays and radioactive sources,

150 cm long straw tubes available from previous production, 10 mm diameter, double side aluminized mylar, 8 layers of 16 straws

Integration of this prototype in an existing laboratory setup with tracking detectors, with test electronics and data acquisition
Detectors:

- straw tube detector:
  straws 4 mm diameter, 2 layers, S=4.4 mm, dZ=4 mm,
  111 straws, sensitive area ~ 23-24 cm^2

- 6 plane module drift chamber:
  2*X, 2*+30deg, 2*-30 deg, 10 mm drift cell (+- 5 mm)

a hybrid detector – with GEM foil - gas electron multiplier,
inserted in a drift chamber as a preamplifier for registration
of ionization clusters
Available test electronics

- a 16 channels current amplifier (CMD components), gain 10 mV/mka, rise time < 8 ns, noise ~ 1 mka; bypolar output;
- amplifier-discriminator CMP 16, amplification 8 mV/mka, rise time 7 ns, LVDS output
- adapters and booster amplifiers for creating unipolar signals and matching between analog and digital electronics
- preamplifiers and discriminators from TOF experiment
- some FEE electronics from WASA CELCIUS experiment
Digital electronics

TDC-F1, 64 channels, LVDS input, in normal resolution mode 7.8 mks measurement range, resolution 120 ps LSB, used in WASA and ANKE at COSY

Fast QDC – a flash ADC with a sampling frequency of 160 MHz, range 6.4 mks, 11 bits, up to 0.4 V. FPGA programmed algorithm which identifies the number of pulses, time position (~1.56 ns), amplitudes, charges, used in WASA at COSY
space and double-hit resolution; gas mixtures: Ar/CO2, Ar/C2H6, Ar/CO2/CF4

identification power: comparison of GEMDC measurements and multiple ionization measurements in straw tubes; algorithms;

choice of the preamplifier-discriminator, splitting into analog and digital parts, optimization of the noise, grounding; digital electronics, data acquisition, software for data analysis;

implementation of a sector-prototype with a realistic mechanical design;