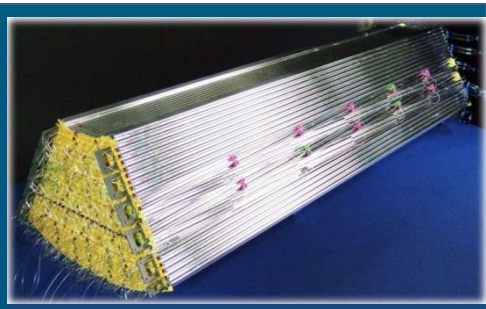
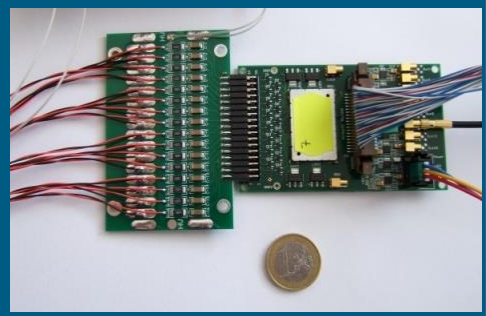
STT Status Report

Peter Wintz | for the STT Group

56. PANDA CM, TRK Session, Mar-2nd 2016





Outline

- Timelines 2016/17
- Status dE/dx readout
- Beam tests

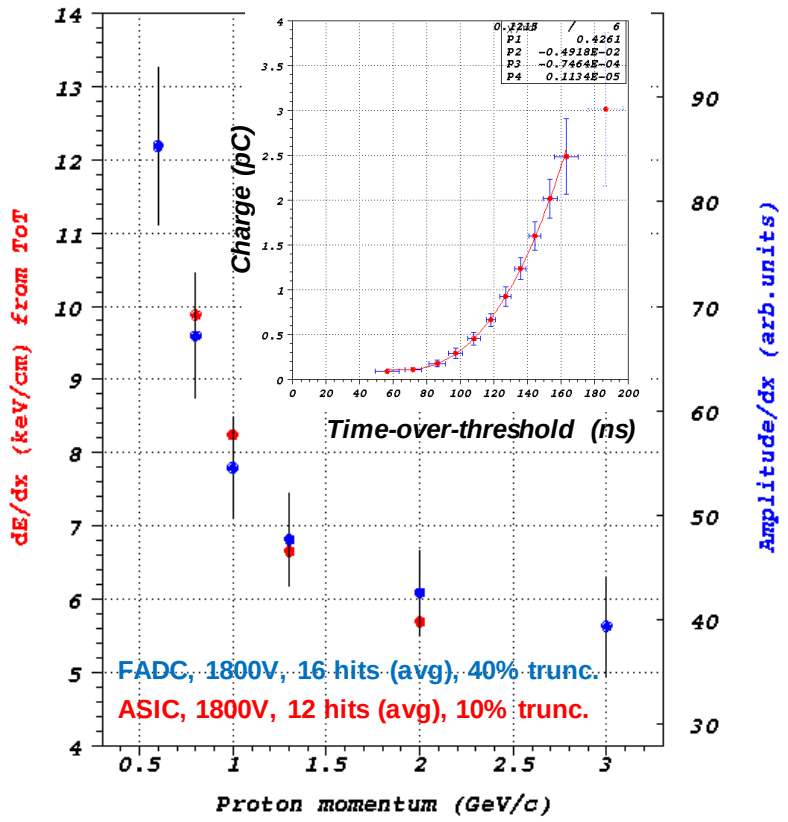
Timelines 2016/17

- 2016: Construction of “pre-series“ STT system (one sector), set up pre-series electronic readout systems for both ROs
- Apr-25th ´16: 1 week proton beam test in new COSY-TOF area
- Mid 2016: Readout workshop in Krakau, readout status reports and definition of criteria for STT readout decision
- Nov-21st ´16: 1 week deuteron beam (allocated, date still prelim.)
- Early 2017: 1-2 weeks proton/deuteron beam (planned), completion of pre-series in-beam test campaign,
- Q2 / 2017: Decision on STT electronic readout system

dE/dx Readout Status

- ASIC/TRB prototype data (red dots, left y-axis)
  - Time-over-threshold ↔ charge calibration (by ^{55}Fe here, later with proton beam)
  - Only 12 hits/track → 10% truncation only
- FADC prototype data (blue dots & axis)
  - 16 hits/track, up to 40% truncation best
- Clear dE/dx sensitivity seen for both
- Reminder: dE/dx min ~ 5 keV/cm

  @ 2bar Ar/CO_2(10%)



ToDo: dE/dx Readout

- Repeat with pre-series readout systems, (close to) final components
- Cover larger dE/dx range (~ 6× mips) with deuteron beam
  - Preamp saturation, (ion) tail cancellation
- Track angles, z-dependence

- ToT methods & calibration (dE/dx or ToT for PID)
  - High / low threshold for ToT resolution, optional: ASIC with 2-thresh. capability
- FPGA pulse analysis (online) for ADC
- Drifttime (isochrone) resolution (150µm) together with dE/dx resolution (<10%)
- Finally: proton – deuteron separation power

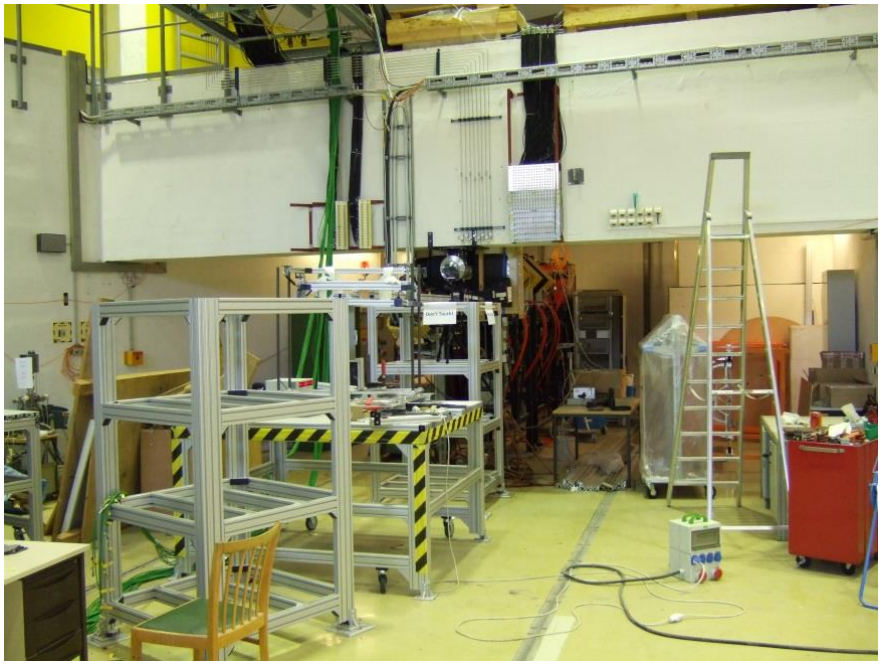
Beam Tests 2016

- 1 week proton beam in April, 3x momenta 0.5 – 3.0 GeV/c
  - dE/dx range: ~ 2.5 x mips
- 1 week deuteron beam in Nov (prelim. date), 3x momenta 0.5 – 3.0 GeV/c
  - dE/dx range: ~ 6 x mips
- New readout systems
  - Pre-series ASIC/TRB system (PASTTREC - ASIC, TRB3)
  - Integrated amplifier/ADC readout system, decoupled HV distribution
- New straw setup
  - Straw alignment checks (Δx, Δy steps) by beam tracks
  - Horizontal and vertical inclinations by new straw mechanical frame

New Beam Area

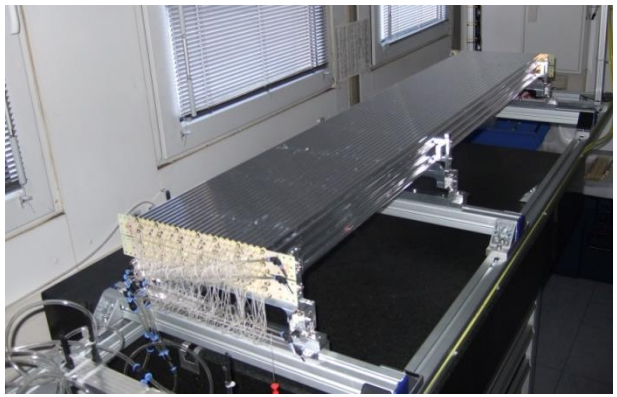
- Larger range of in-beam positions possible (inclined, shifted straw setups)
- ~2m beam line height, new detector platforms ready
- Services and cabling to counting room (almost) done
- Installation of electronic/service racks ongoing

- Installation of detectors in beam area next weeks (COSY area cleanup still ongoing)



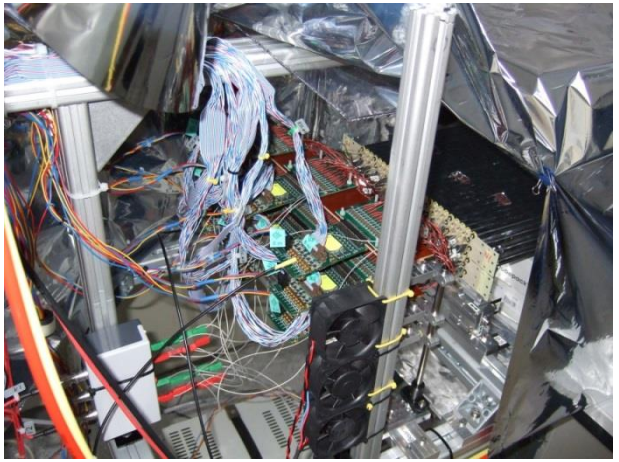
New Straw Setup

- New straw module – frame alignment method
- Alignment at 3 positions (at both ends & center)
- Positioning in $\Delta x, \Delta y$ steps (50µm spacer plates)
- Check alignment (wire-tube centering) by beam tracks (“2nd leg“ disappearance)
- Setup with ASIC/TRB readout



New straw setup (two quad-layer modules) for in-beam tests

New straw setup (shielded)



New straw setup with ASIC/TRB readout

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.. for installations in Juelich

Thank you for your attention