Agenda for Today

- STT readout meeting continuation
- Readout decision
- ASIC/TRB status
- SADC system
- AOT

STT Readout Meeting Continuation

- Possible topics for future meetings
  - ASIC/TRB3 status
  - SADC system further development
  - Electronic racks & cable routing at PANDA-TS
  - STT installation scheme and readout pre-tests
  - PANDA-Root implementation (algorithms, calibrations,..)
  - Real-time data processing (FPGA)
- Organisation (monthly, two-monthly, ..)
- Query for meeting continuation

STT Readout Decision

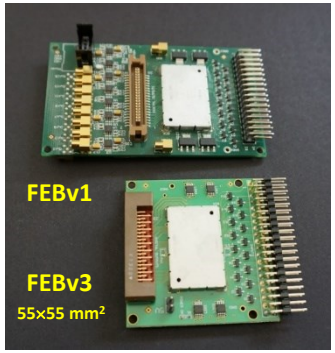
- Phase-1 experiments cost review by FAIR council soon in 2019
- In-kind budgets must be allocated
  - Definition of detector systems, work packages & groups, investments
  - Construction MoUs in progress
- Day-1 installations in 2023, running-in with proton beam in HESR

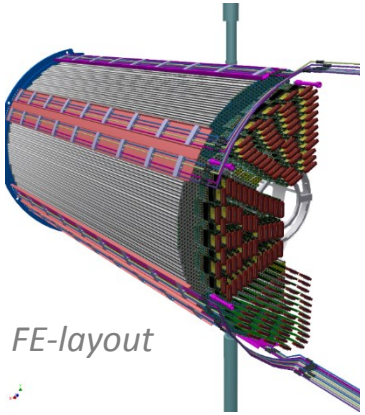
- STT readout decision could be not postponed, decision taken by PANDA-CB
  - PASTTREC-ASIC & TRB3-TDC as readout for STT and FT at Day-1
  - Decision was based on risk evaluation and budget availability
  - TRB3 system is not suited (BW limit) for full luminosity at PANDA
  - Upgrade of readout system for later experiment phase considered: full lumi & better PID capability, ASIC/TRB3 can be then transfered to FT5-6

- ADC system should demonstrate better PID capability (dE/dx separation) as specified in the STT TDR

STT Readout Systems Overview

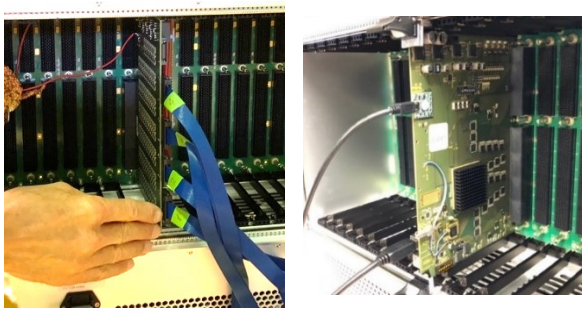
- PASTTREC ASIC & TRB TDC
  - Time and signal pulse width (ToT)
  - In-beam tests completed
  - Mechanical FE-layout to be done (cooling)
  - Complete scheme worked out, data concentrator HW identified
  - TRB3 not for full luminosity mode (BW limit, FPGA)
  - PASTTREC/TRB3 readout for phase-0 STS@HADES



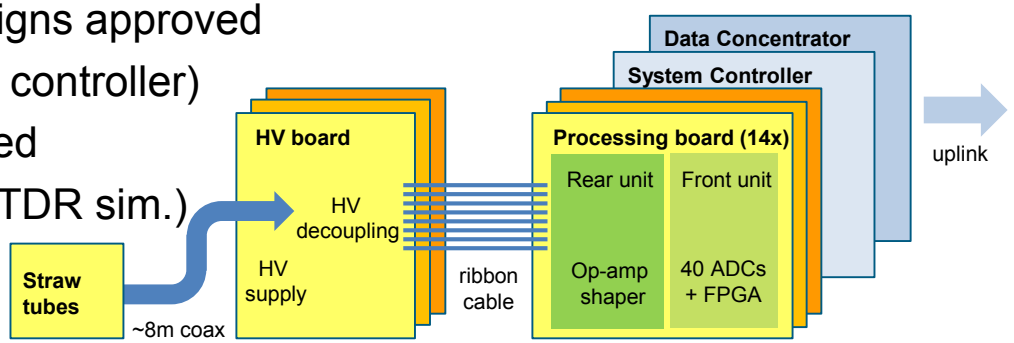


FE-layout

- SADC & “FEE-free”
  - Time and pulse area by full WF readout (FPGA)
  - Single straw channel accessible from backend
  - FoS tested in-beam 2018, HW designs approved
  - Larger setup required (with system controller)
  - Further cosmic & beam tests needed
  - PID by dE/dx to be demonstrated (TDR sim.)
  - Design for full luminosity



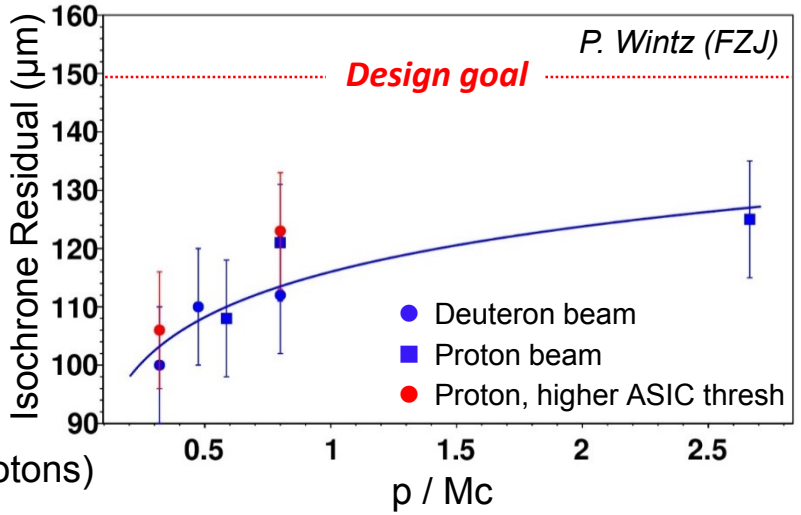
Double-sided crate with Op-amp and ADC board



ASIC/TRB Results for STT

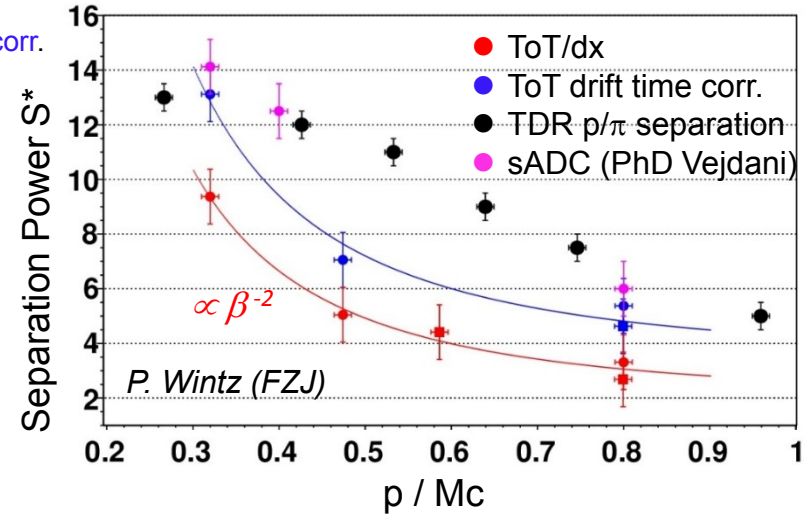
- Proton and deuteron data (2016 & 2018)
- Large dE/dx range covered (~1-10x mips)

- Spat. resolution better than design goal
- Measurements at worst location (grav. sag)



- Separation power S versus β (ref. 2.5 GeV/c protons)
- Observables studied: ΣToT/Σdx and ToT $|_{\text{time corr.}}$
  - $1/\beta^2$ dependence for PID
  - Starting S ~ 4
- "Compared" with p/π separation

  (TDR, p/π simulation)



$$*Separation\ Power\ S = \frac{\langle M_1 \rangle - \langle M_2 \rangle}{(\sigma_1 + \sigma_2)/2}$$