News on the Forward Tracker

- Status of the STS2 station for the Phase-0 at HADES
- Studies of aging with a strong ^{55}Fe source

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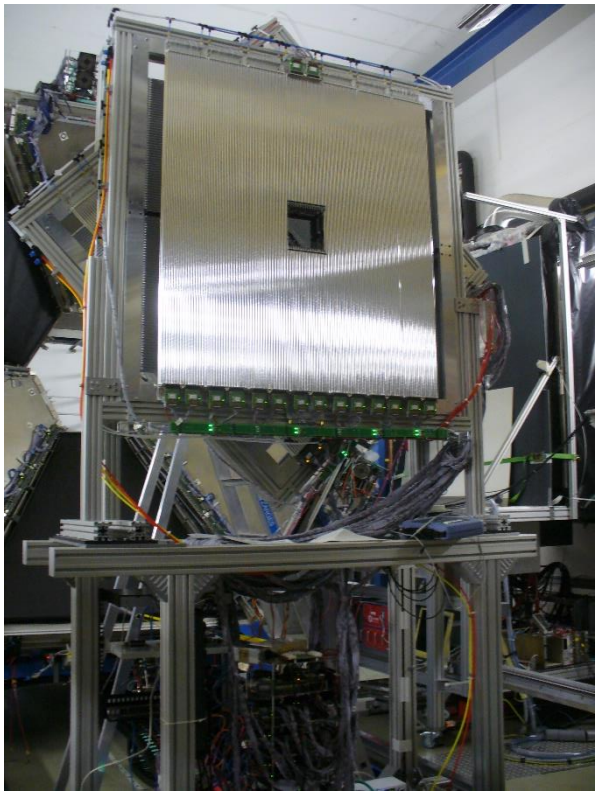
STS2 installed at HADES

- Four double layers of straws (0°, 90°, +45°, -45) mounted on two frames; total of 1024 straws

front



rear

Supplies

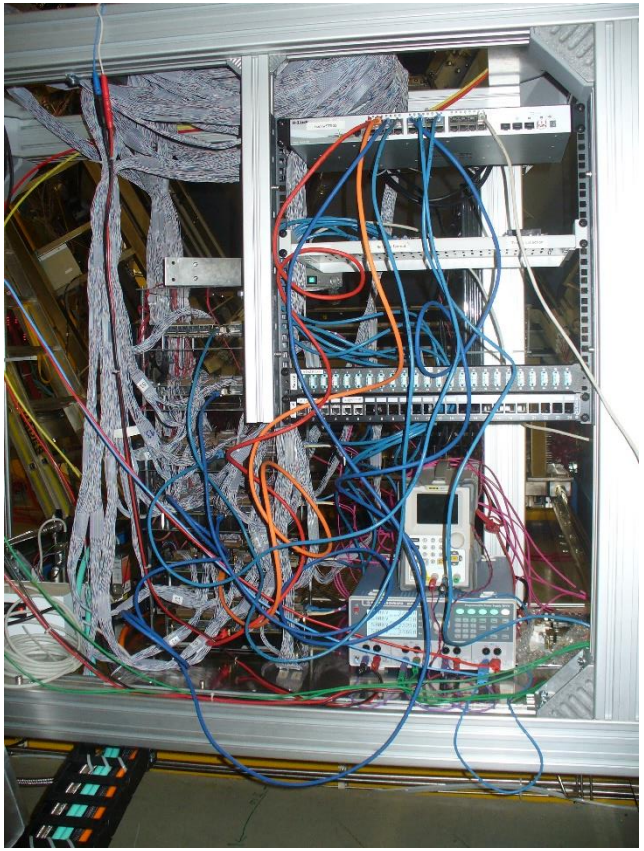
Gas system:
gas mixing + gas distribution (2 lines)

Control:
EPICS + GUI based on CSS

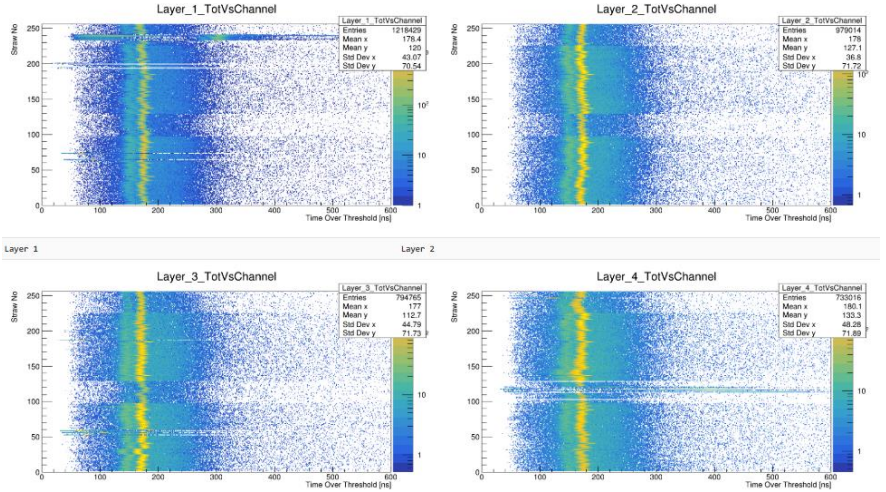
HV supply:
CAEN SY4527 – 8 channels for STS1+STS2

Readout (STS2)

64 FEE 16-channel cards + 6 TRB boards integrated with HADES DAQ



Online ToT spectra taken for ^{55}Fe



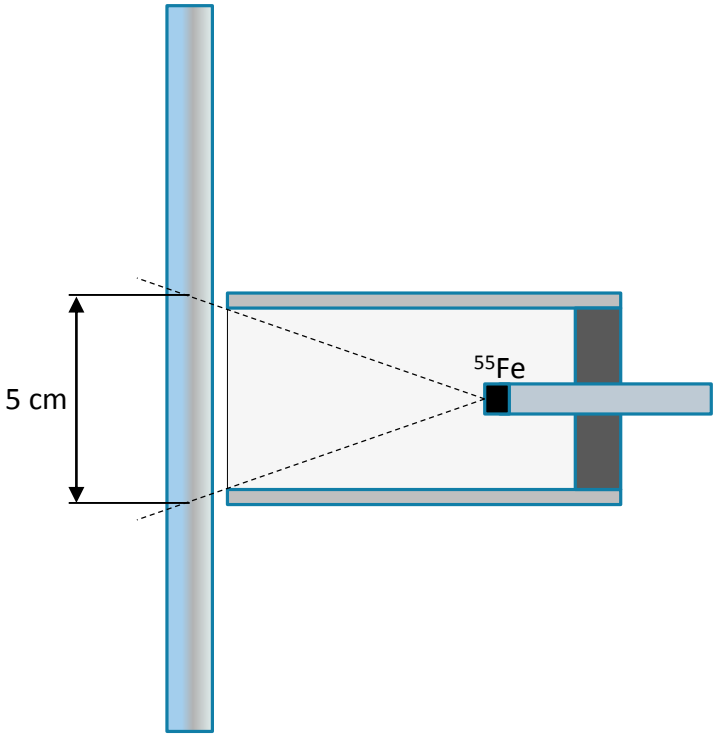
Aging test performer in 2019

Operating conditions:

- Gas mixture: Ar+CO_2 (90:10) at 2 bar
- HV: 1850 V, gas gain: ~5×10^4

Irradiation:

- 4 straws irradiated, each on a length of 5 cm
- Period: 44 days
- Accumulated charge: 0.36 C/cm

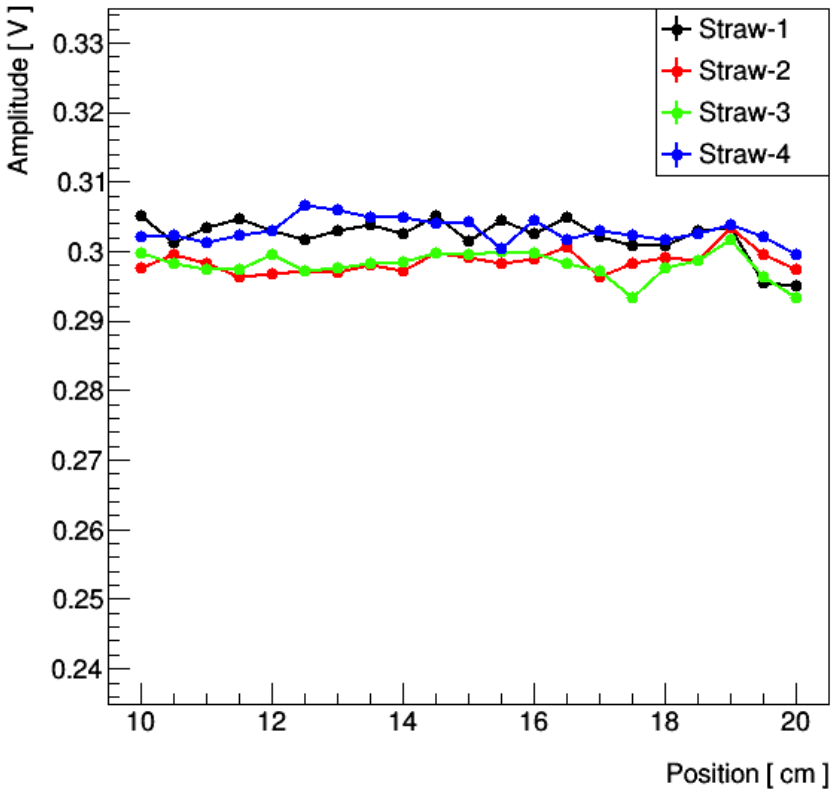


Measured:

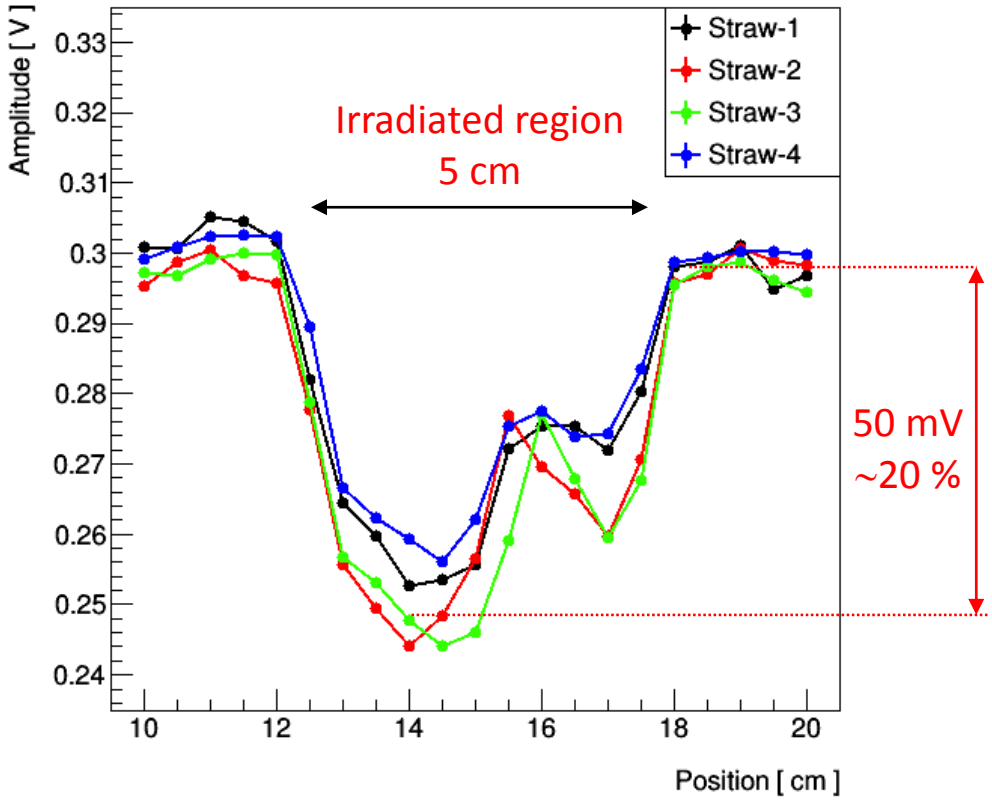
- Rate: ~ 300 kHz/straw (~ 60 kHz/cm) registered with the TRB
- Current: ~ 500 nA/straw monitored with precision of 0.1 nA
- Amplitude of pulses: monitored with a scope
- Amplitude of pulses as a function the position along the straw was measured for accumulated charges: 0.0, 0.085, 0.194 and 0.36 C/cm

Amplitude vs. coordinate along straw

New (Q/l = 0 C/cm)

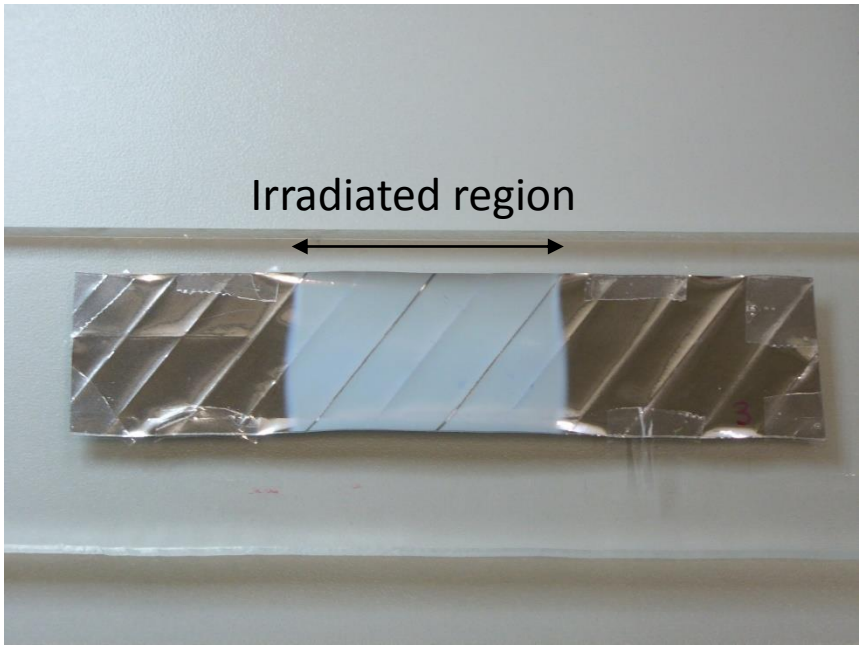


Irradiated (Q/l = 0.36 C/cm)

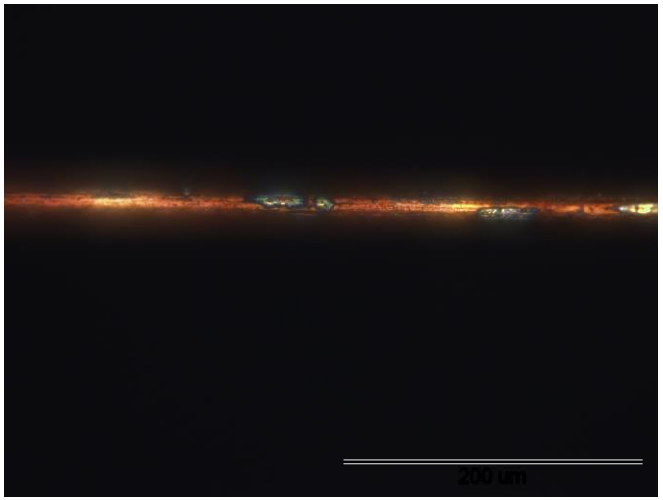


Deposits on straw and on anode wire

Irradiated **straw material**



Irradiated **anode wire**

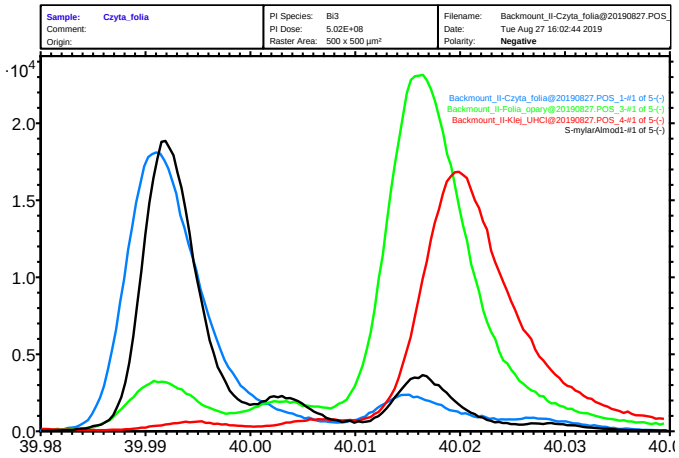


New

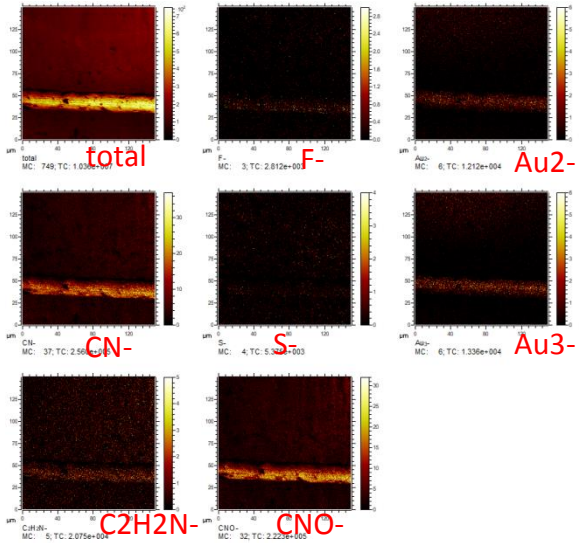
Analysis of deposits

- Deposits on the irradiated wires and on the Mylar foil has been scanned using the TOF-SIMS (Time Of Flight - Secondary Ion Mass Spectrometry).
- Cathode and anode deposits contain H, C, N and O which may originate from organic compounds
- The main suspect is outgassing from applied epoxy adhesive (UHU Endfest 300) or PVC gas pipes.

Mass spectrum of deposits in C_2H_2N region:
blue: Mylar, black: irradiated Mylar, red: UHU,
green: Mylar exposed to UHU vapour



Imaging of various deposits on irradiated wire



New aging tests

- 4 straws irradiated with 55Fe:
  - 2 straws glued with **UHU Endfest 300** *(used so far)*
  - and another 2 with **Araldit AY103 + hardener 991** *(low outgassing epoxy adhesive suggested for gas detectors by the CERN PH-DT-DI Gas project)*
- Irradiation started in the second half of February and we expect to reach the integrated charge of 0.5 C/cm in June.