CBM + HADES detector tests at COSY in Q1/2018, and outlook to Q1/2019

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# Beamtime in calendar week #9 (26.2. – 5.3.) 2018

- with set-up of equipment in the preceding MD week
- JESSICA cave, protons of E_{kin} = 1 GeV
- detectors tested:
  - CBM-STS:
    - prototype modules with near-final integration of sensor, microcable, read-out ASIC
    - relevance for Sensor Production Readiness Review in April 2018
  - CBM-MUCH:
    - had to be cancelled due to travel clearance issue of the VECC team
  - HADES/CBM Start-Veto:
    - first test of Ultra-Fast Silicon Detectors

Outlook: further component tests considered in Q1/2019

(1) CBM Silicon Tracking System

fiber Hodo1   STS1   STS2   fiber Hodo2

1 GeV protons
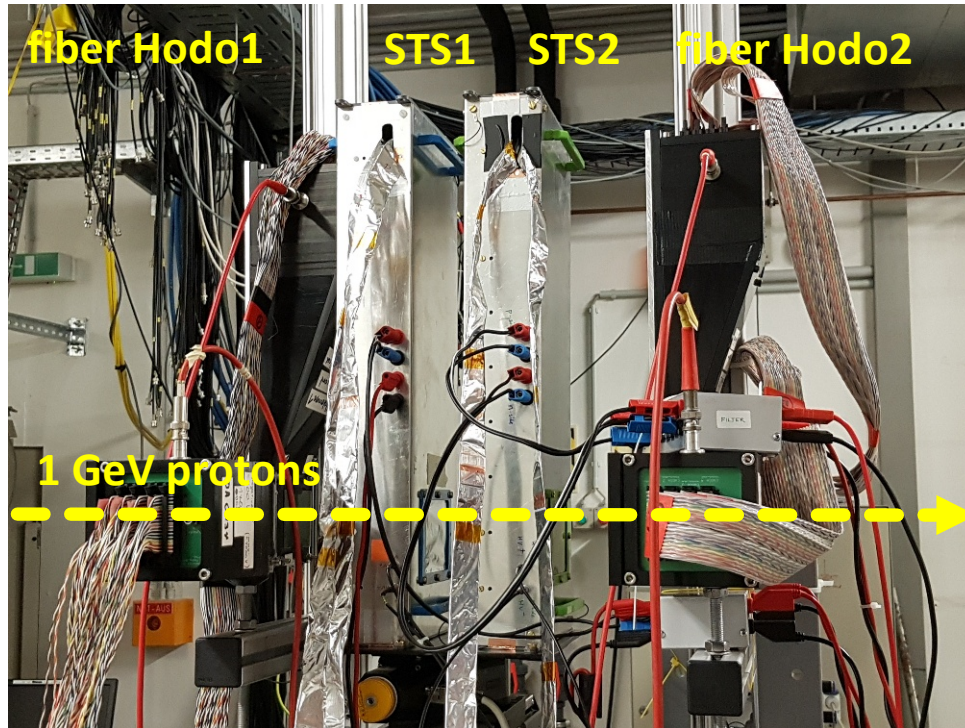
prototype STS module
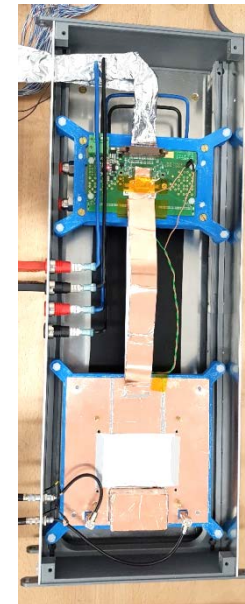
read out with prototype free-streaming DAQ system

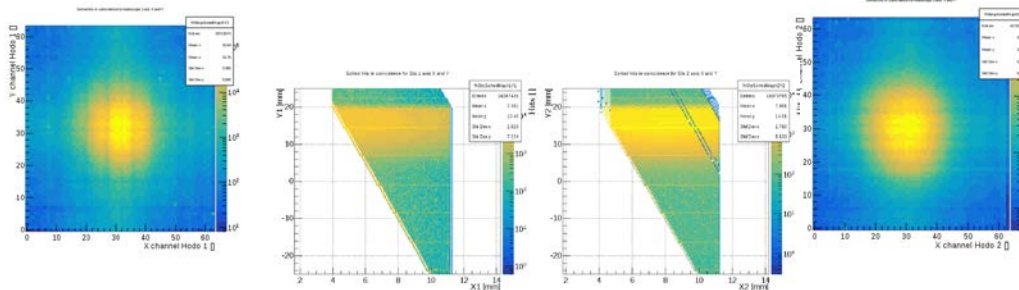*STS-XYTERv2.0 on FEB-B*

microcables

silicon microstrip sensor
- *285 μm thick*
- *strips 4 cm long*
- *2-sided, 7.5 deg stereo angle*
- *128 channels/side read out*
→ *triangular overlap area*

preliminary results:

- o noise:
  1090 ±150 e (n)
  1350 ±200 e (p)
- o signal mean:
  16720 e (n)
  20300 e (p)

- o read-out threshold:
  7000 e
- o signal-to-noise:
  15±3
- o hit detection
  efficiency: > 95%

(2) Ultra-Fast Silicon Detectors for the HADES/CBM Start-Veto System

First test with 1 GeV proton beam @ COSY

- ➢ A beam telescope made of 3 sensors:
  - ○ Two double-sided scCVD diamond sensors
  - ○ One UFSD with pad readout in between
  - ○ time precision and efficiency determination
- ➢ Data analysis in progress
- ➢ Expected time precision below 100 ps and high rate capability
- ➢ Possible PID by ToF and dE/dx

Diamond sensors prepared by GSI Detector Laboratory

UFSD sensor from Torino N.Cartiglia, M.Ferrero, V.Sola

scCVD diamond

UFSD sensor

scCVD diamond

beam direction

J. Heuser - CBM + HADES detector tests at COSY
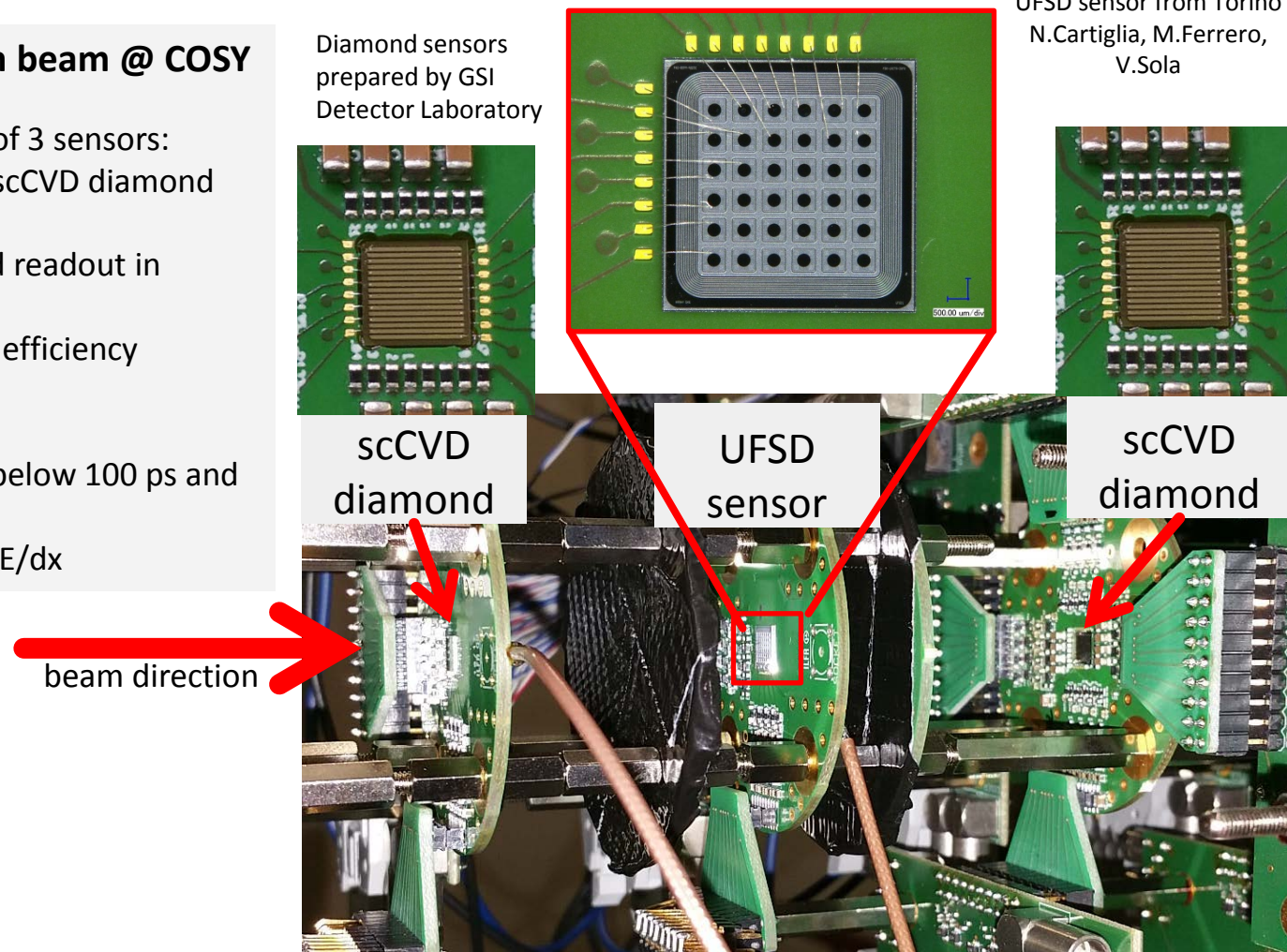
Outlook 2019

For further CBM component tests, we consider a further application at CBAC#9:

- beam-time in Q1/2019
- 1 week
- component tests towards their production readiness, including e.g.
  - read-out ASIC STS-XYTERv2.1
  - TRD front-end electronics
  - …

Thanks for the support at IKP!