Center of Applied Physics and Advanced Detection Systems

Possibilities and technical equipment for MVD detector development and testing at FNSPE CTU in Prague

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CTU team introduction

Our silicon detector team consists of about 12 people, mosty electronic engineers and students. Main focus of our detector group at CTU Faculty of Nuclear Sciences and Physical Engineering in general is mostly **R&D of silicon based detectors and related activities** (readout HW and SW, detector characterization etc.). We have developed a small range of hybrid and monolithic silicon detectors for applications in dosimetry, imaging and tracking.

Currently used technology:

- X-FAB CMOS 180 nm (SoI)
- TSMC CMOS 65 nm

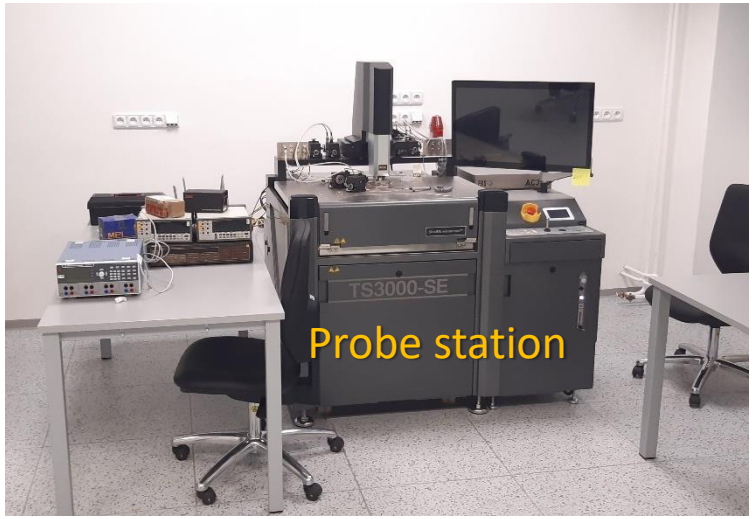
Participation in many research projects:

- ❑ **FAIR Panda MVD** – currently characterization of MVD strip part, later R&D of the inner pixel part (maybe based on ITS3 MAPS technology).
- ❑ **CERN** (ATLAS, RD50, RD53)
- ❑ **FNAL**
- ❑ **EIC ePIC** – members of EIC Silicon Consortium, our involvement includes testing and characterization of EIC-ITS3 vertex/tracking detector prototypes (co-development with ALICE-ITS3)

What can we offer to PANDA MVD?

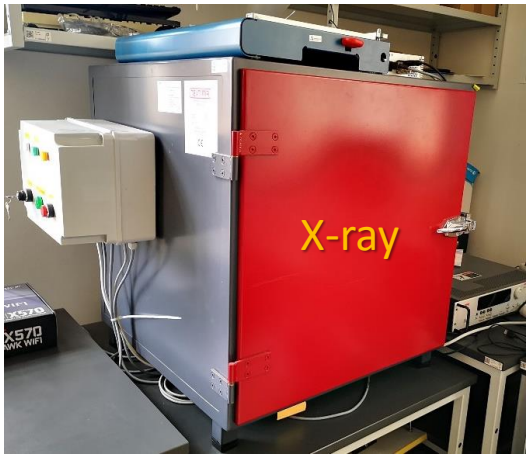
- Our expected manpower in PANDA is around **0.4 FTE/year in the near future.**
- **Our resources** – equipment for characterization, testing, quality assurance of silicon detectors and ASICs in terms of detector response to high energy particles, radiation tolerance and electrical characteristics (IV, CV measurements).

  For wafer and sensor testing we have available **a clean room with the automatic probe station** MPI TS3000 with 300 mm high voltage (up to 1100 V) thermal chuck (temperature range -40 to 200 C).



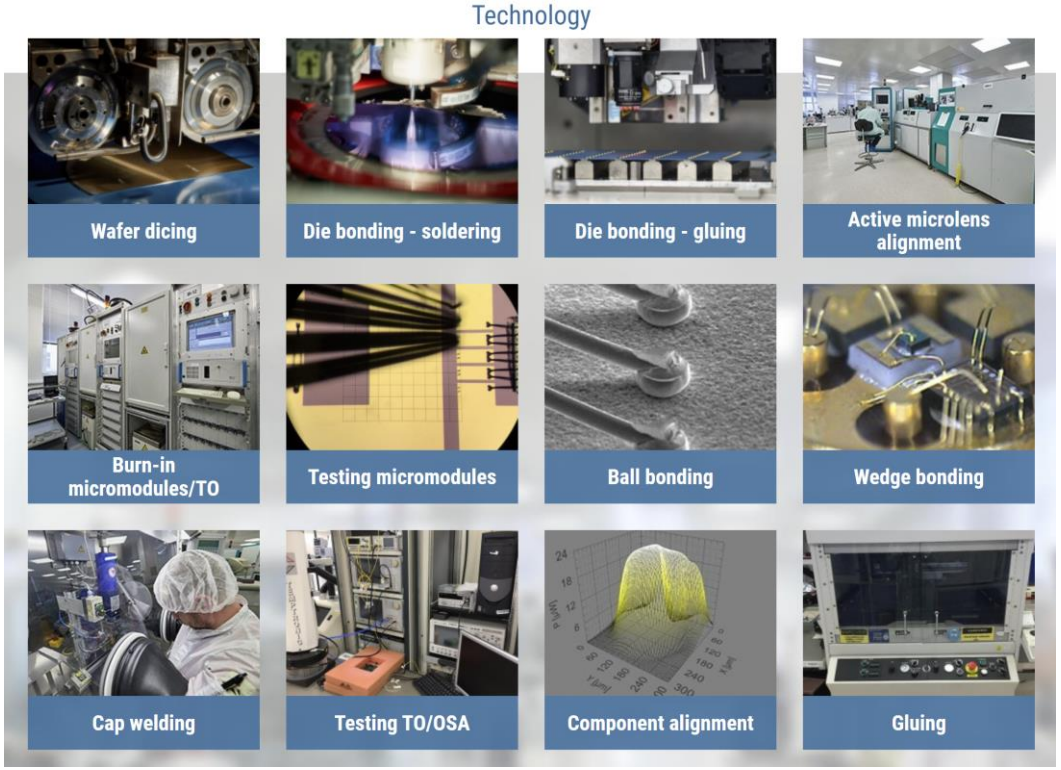
What can we offer to PANDA MVD?

- Irradiation tests of detectors – available resources in collaboration with our partners:
  - **“In house”**: X-ray source 120kV, 36W, various table radioactive sources (Fe55, Am etc.), slow and fast neutrons (AmBe, 14 MeV DT generator, small nuclear reactor),
  - **UJP Prague** (ujp.cz): Cobalt-60 gamma ray, measured dose rate up to 400 Gy/min in area 5x5 cm^2,
  - **Nuclear Physics Institute CAS Rez** (ujf.cas.cz): reactor neutrons, ~30 MeV proton and heavy ion beam, electrons up to 25 MeV.



What can we offer to PANDA MVD?

- **For module assembly** (wafer dicing, die bonding, wedge and ball bonding etc.) in prototyping we use services of Czech company Argotech Trutnov (argotech.cz)



Lab visit?

MVD group visit to our FNSPE CTU silicon lab – Thrusday after lunch?