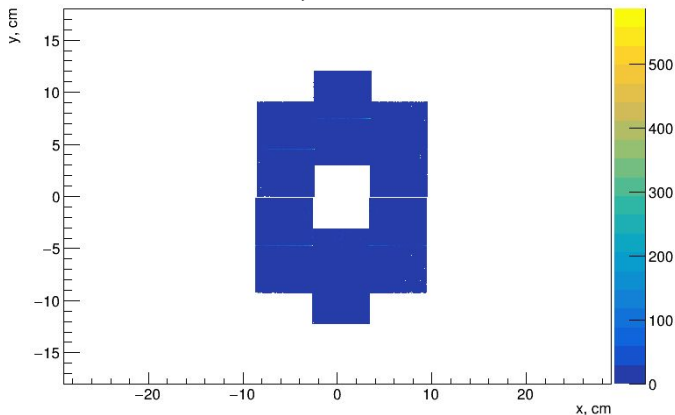


Forward Silicon Tracker status

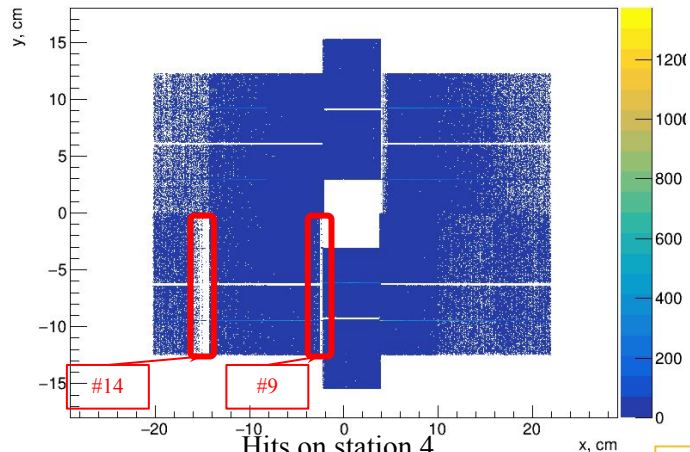
Danil Chemezov on behalf of Forward Silicon Tracker team

Analysis and Detector Meeting of the BM@N Experiment,
12-13 March 2024

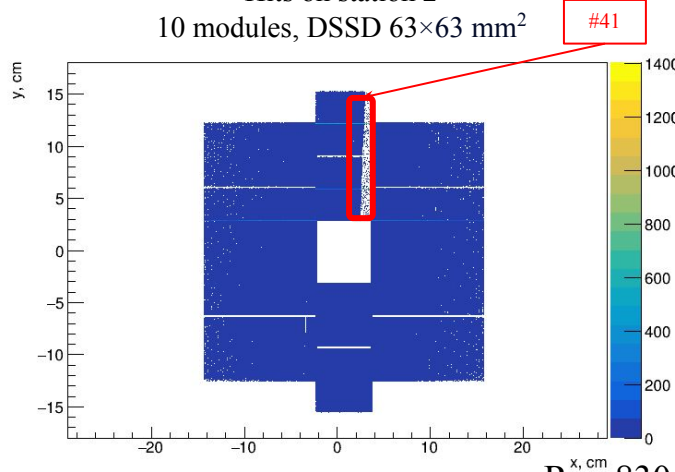
Hits on station 1
6 modules, DSSD 63×93 mm²



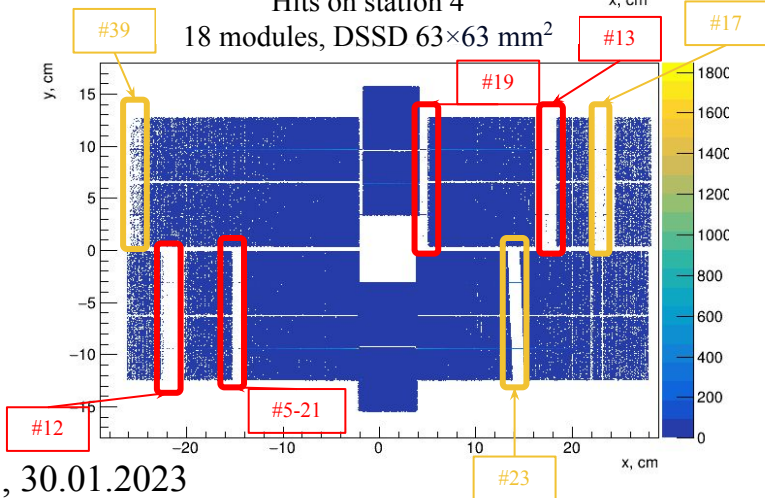
Hits on station 3
14 modules, DSSD 63×63 mm²



Hits on station 2
10 modules, DSSD 63×63 mm²

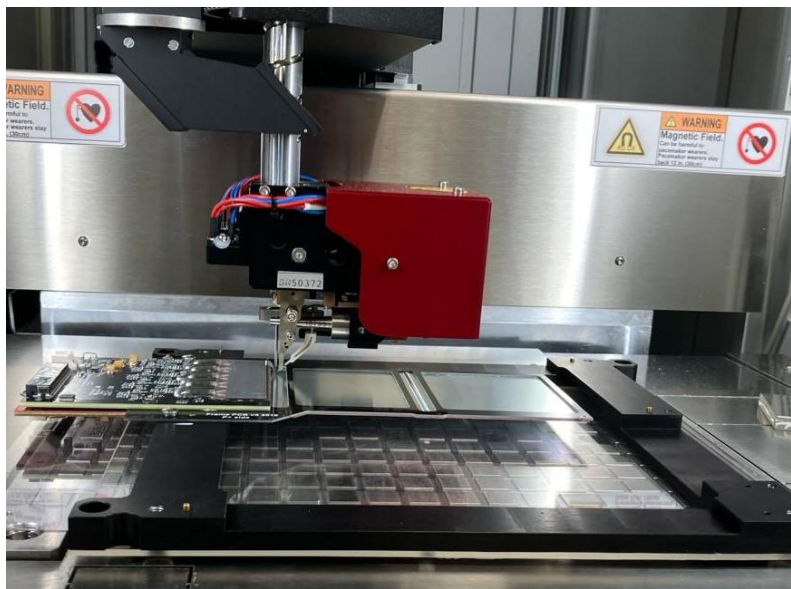


Hits on station 4
18 modules, DSSD 63×63 mm²

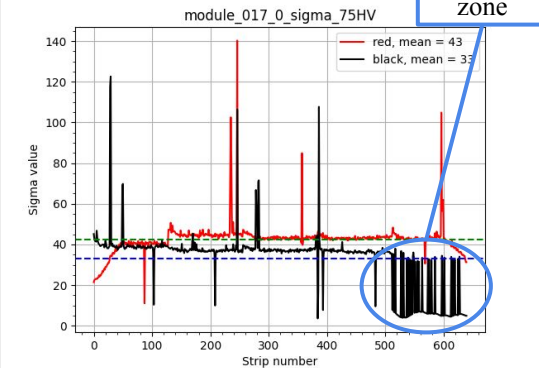
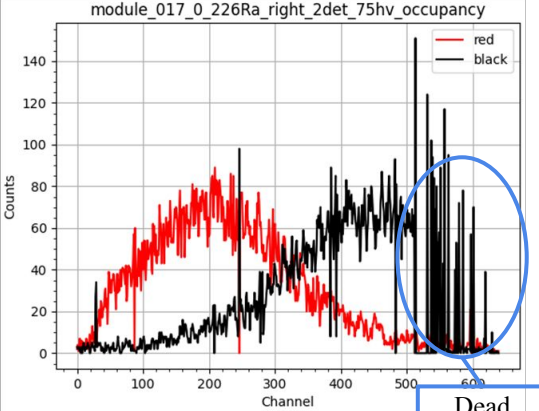


Summary:
10 dead zones, 3
were discovered
before the run and
7 occurred during
the run

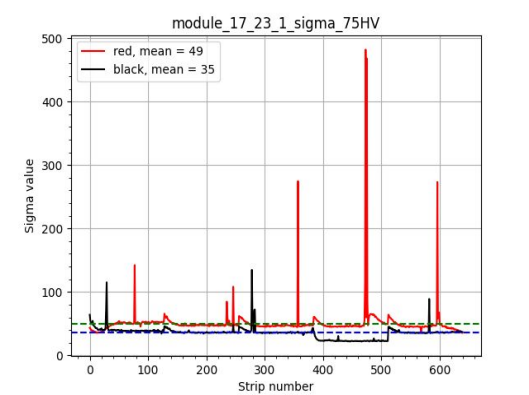
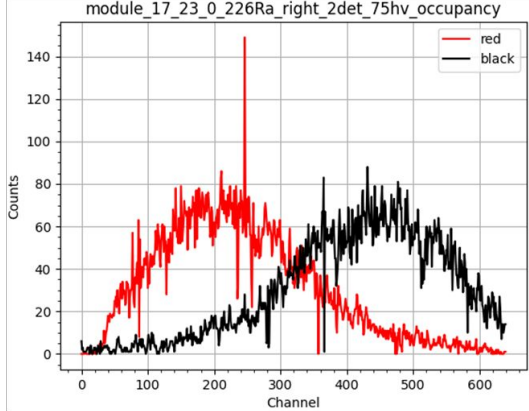
Replacement process



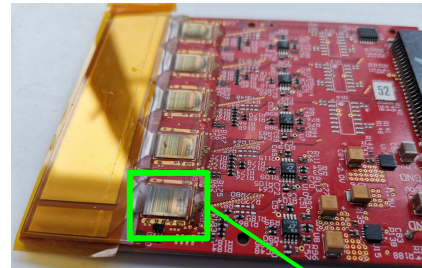
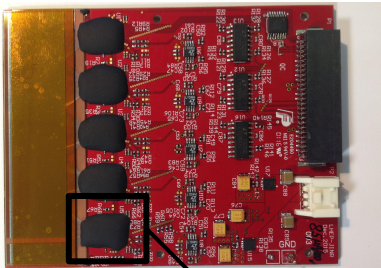
To eliminate the dead zones it was necessary to assemble a new FEE board completely, 5 ASICs were spent to eliminate each of defects. The old boards were disconnected from the modules and replaced with a new ones. Total: 9 new black boards (p+ strips) were built, 45 VATAGP 7.2 ASICs were used (30 spare ASICs available).



Before replacement



After replacement



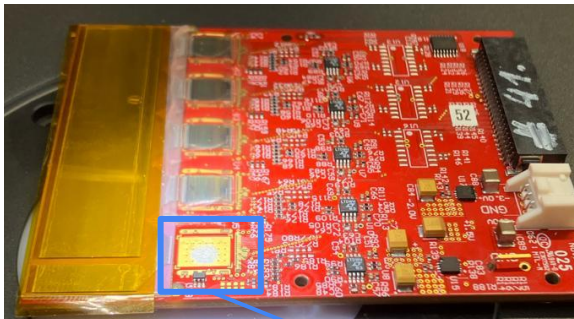
Black BE-08 encapsulant (polarization temperature 100°C)

- an additional optical shield for chips
- **Not removable** mechanically or with chemical solvents (dimethyl sulfoxide, dimethylformamide, CH₂O₂)

Ultra Light-Weld 9008 Flexible, UV-Curable Encapsulant

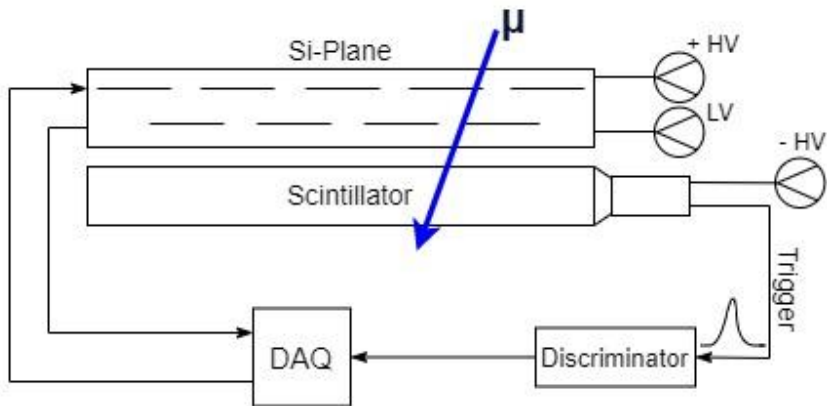
- Does not create an additional optical shield
- Can be mechanically removed so **FEE boards are repairable**

Replacement of one chip:



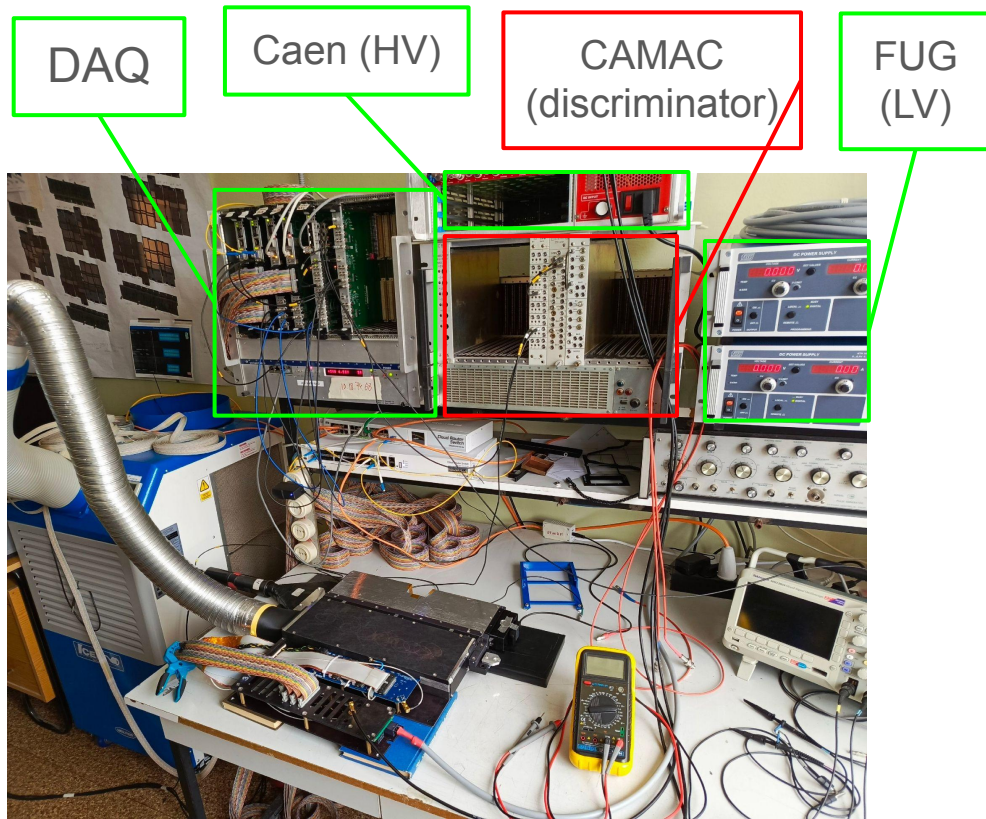
removed chip



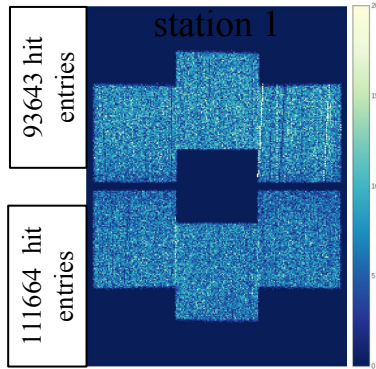


Dimensions:

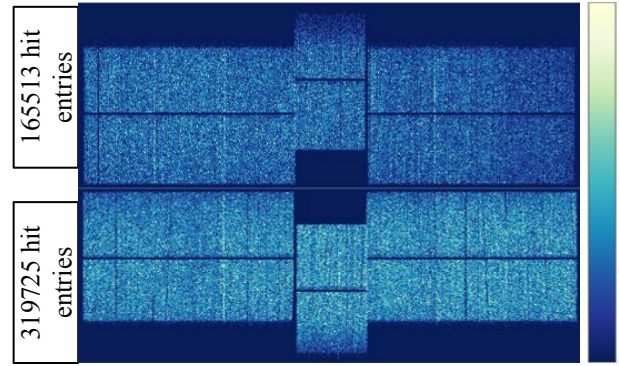
- Scintillator: 150x600 mm²
- Station 1 half-plane: 93x180 mm²
- Station 2 half-plane: 126x300 mm²
- Station 3 half-plane: 126x420 mm²
- Station 4 half-plane: 126x540mm²



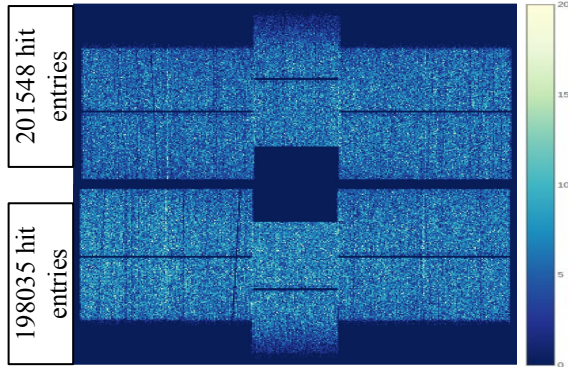
Cosmic tests



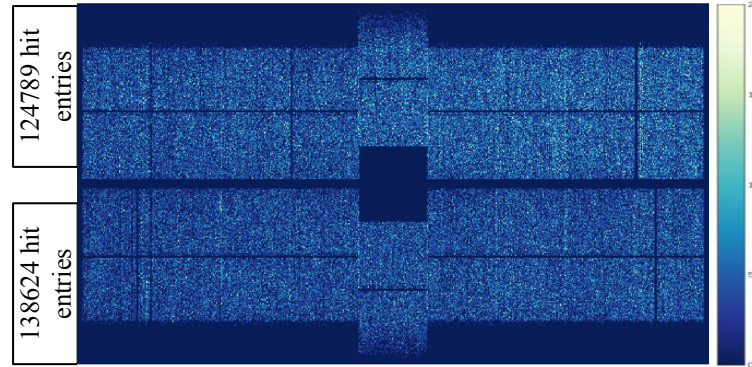
Cosmic tests station 3



Cosmic tests station 2



Cosmic tests station 4



All dead zones have been eliminated!

- We get information about problematic modules from Xe-run results;
- Based on test results, we localize the defect: № module, PCB-type (p+ or n+), №chip on PCB;
- For transparent encapsulant: we can replace a single chip without damaging the others;
- For black encapsulant: replace the entire board, because BE-08 encapsulant not removable;
- 30 spare chips available;
- We are testing removed PCBs and trying to determine cause and type of defects for problematic chips

