

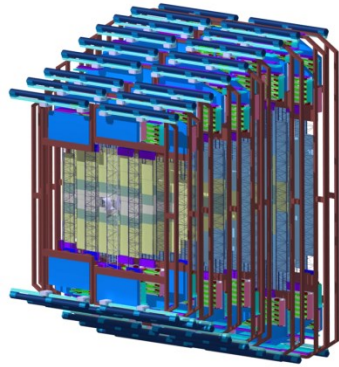
# Status of the Silicon Tracker Project at JINR

*Y.A. Murin for Vladimir Kekelidze, VB LHEP JINR, Dubna*

October 6-th, 2015, Kick-off CREMLIN Meeting at Kurchatov  
Center

- A bit of history
- Recent status of project at JINR
- Plans for the near future and beyond
- CREMLIN WP3 goal

# CBM-STS: silicon microstrip sensors



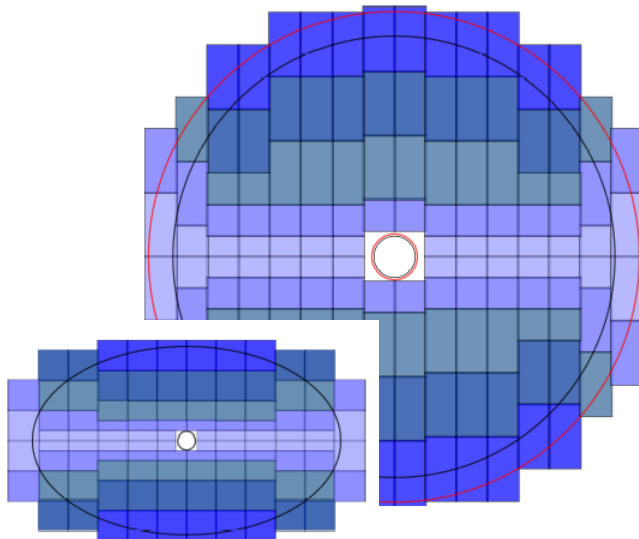
8 tracking stations



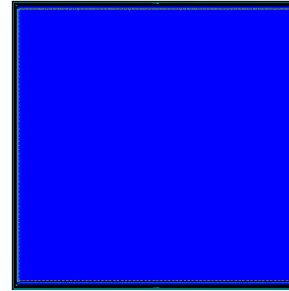
896 modules



106 ladders



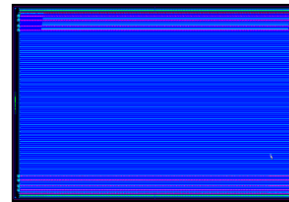
Bird eye View on CBM STS



6.2 cm × 6.2 cm

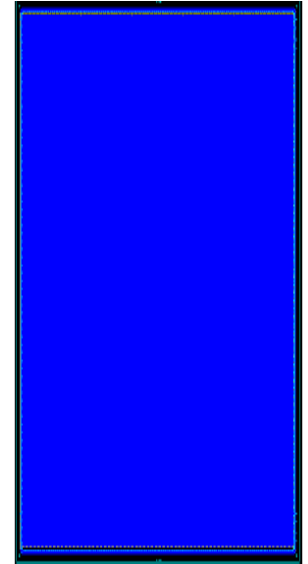
**900**

- 252 single
- 324 daisy-chains



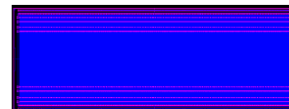
6.2 cm × 4.2 cm

**260**



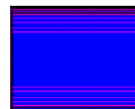
6.2 cm × 12.4 cm

alternative for two daisy-chained sensors



6.2 cm × 2.2 cm

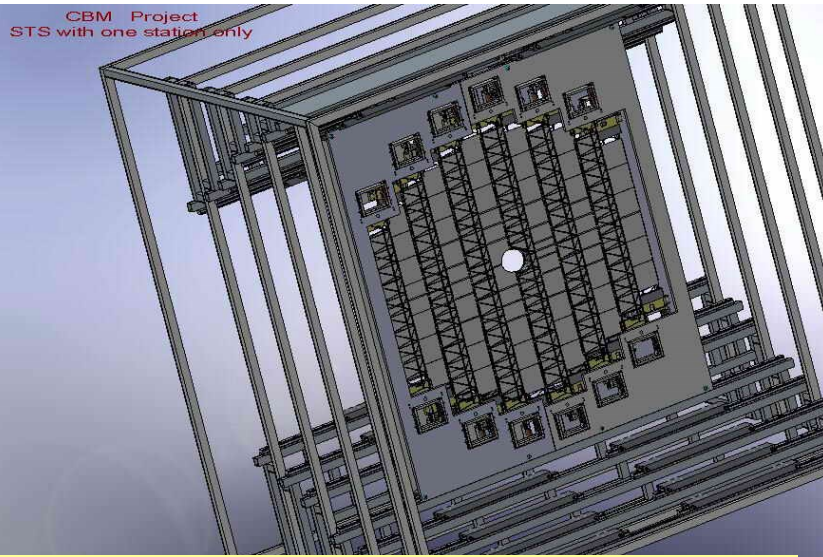
**60**



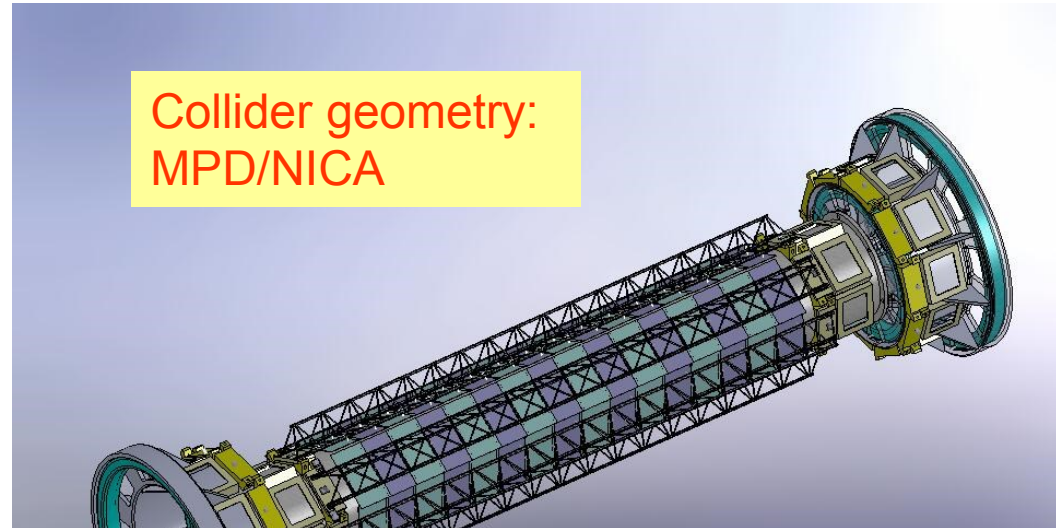
3.2 cm × 2.2 cm

+ small number of “half” sensors

# Understanding the importance of the ladder concept : Development of fast, radiation-hard, high-precision, and low-mass tracking systems based on Silicon Microstrip Sensors

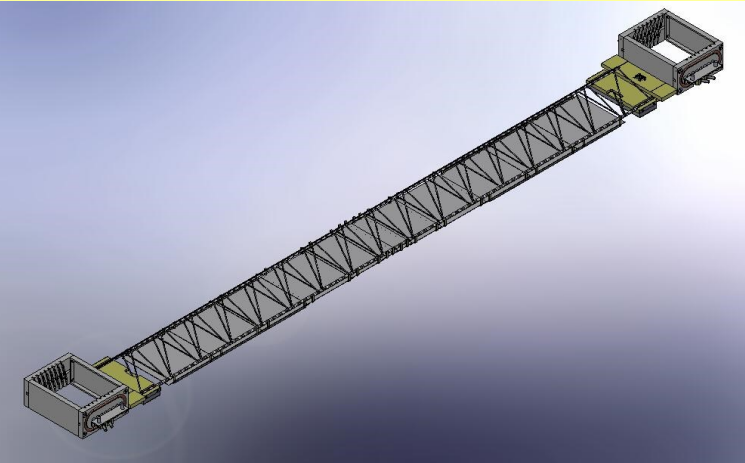


Stationary target geometry:  
CBM/FAIR and BM@Nuclotron



Collider geometry:  
MPD/NICA

Coordinators: V. Kekelidze, Yu. Murin  
P. Senger, J. Heuser  
BMBF-JINR Generic Grant Support



Common detector element („ladder“):  
a low-weight CF support frame carrying  
up to 10 detector modules each comprising  
a double-sided Silicon microstrip sensor  
+ 16 ultra-low-mass cables + 8 ASICs on a  
cooled Front-End Board

# Evolution of the STS project

No	Period	Major achievements	Budget Source	Milestones
1	2003-2007	Establishing a steady link with German Partner (Igolkin's frames)	EU funded ISTC Project of the Khlopin Radium Institute, SPb	CF ultra-light frames, Russian-made prototype of a CBM STS sensor and its radiation tests, freon cooling system review
2	2008-2011	Establishing a CBM-MPD STS Consortium of Institutes from JINR member countries (Ukraine - ultra-light cables, Belarus - special equipment)	Move to VB LHEP getting support through Generic BMBF Grant	Finalizing R&D on ladders, signing a FAIR Collaboration Contract for production of 60 ladders at JINR
3	2012-now	Installation of module and ladder assembling lab at VB LHEP, preparations for the STS parts tests at Nuclotron	GSI-JINR Cooperation in building STS for the planned experiments at NICA and FAIR	Establishing a production line for assembling modules and ladders and start of training of the personal



# JOINT VB LHEP-GSI module/ladder assembling lab at Dubna





# VB LHEP STS workgroup at the roof of clean rooms (19.12.2014)



June 18th, 2015



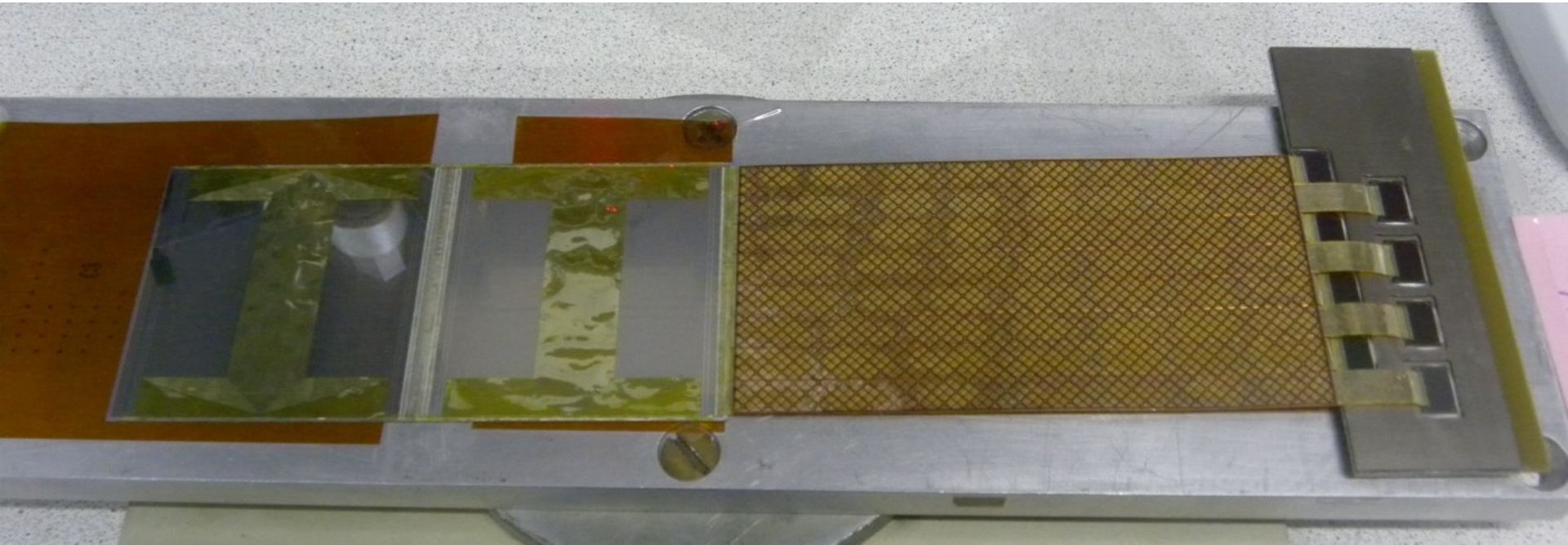


The 2015 milestone: assembly of one and two -sensor module mockups (by the fall) and prototypes (by the end)





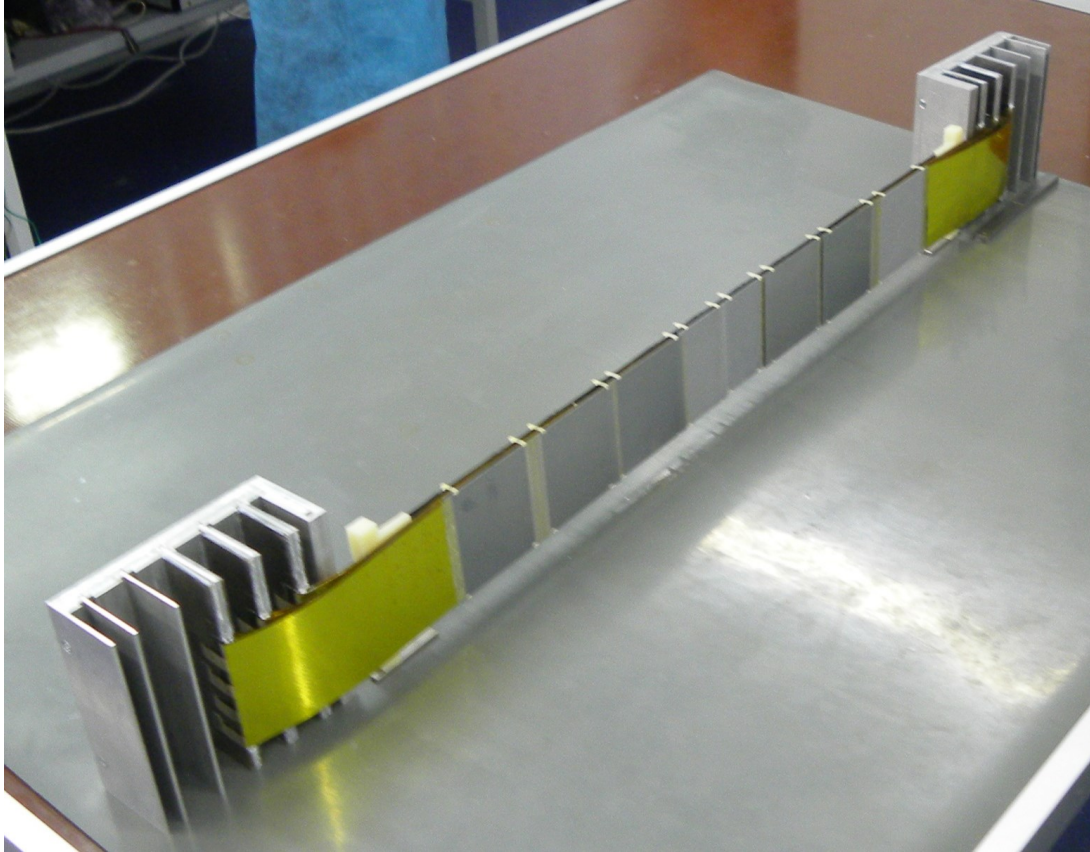
# The 2015 challenge: assembly of prototype modules with one and two-sensors



*mockup*

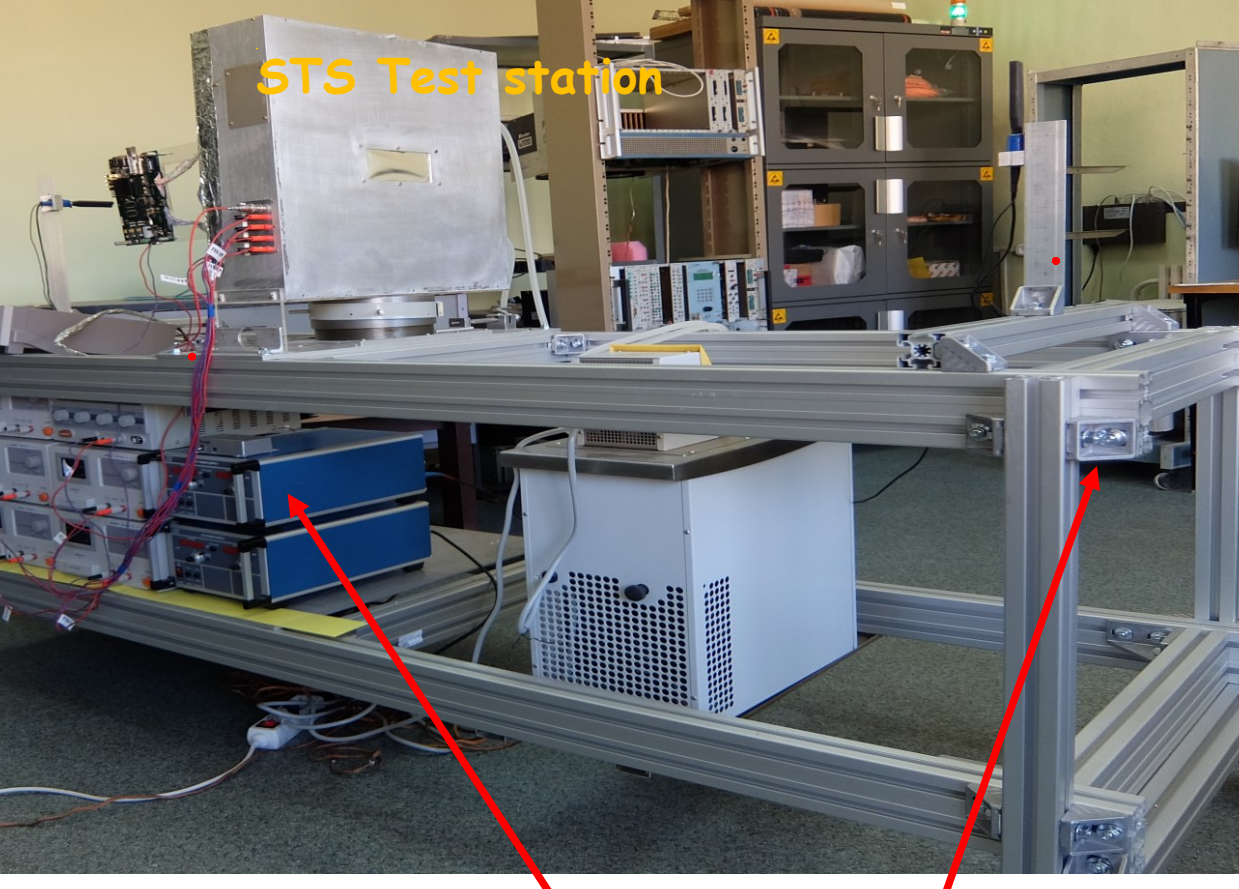
Together with industrial partner -  
Light Diode Technology Ukraine, Kharkov, Ukraine

and the super modules full scale mockup...



Together with industrial partner -  
Planar-SO Ltd, Minsk, Rep. of Belarus





STS Test station

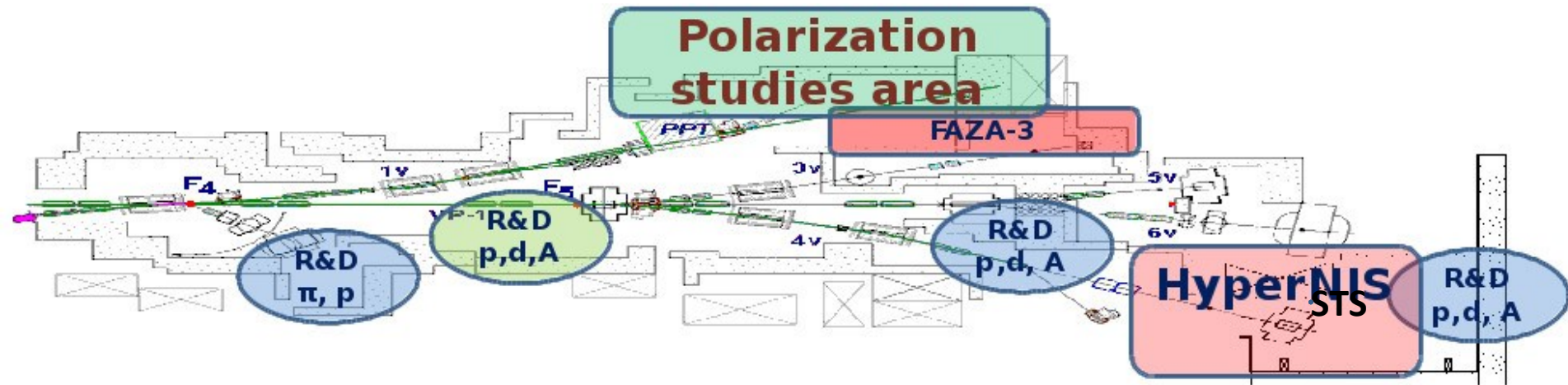
Remotly controled:

Low voltage power suppliers:  
AKTAKOM APS 3320L

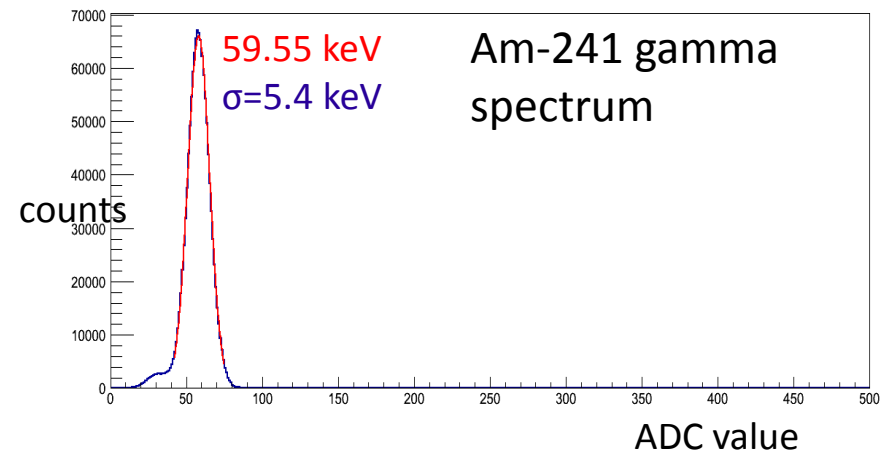
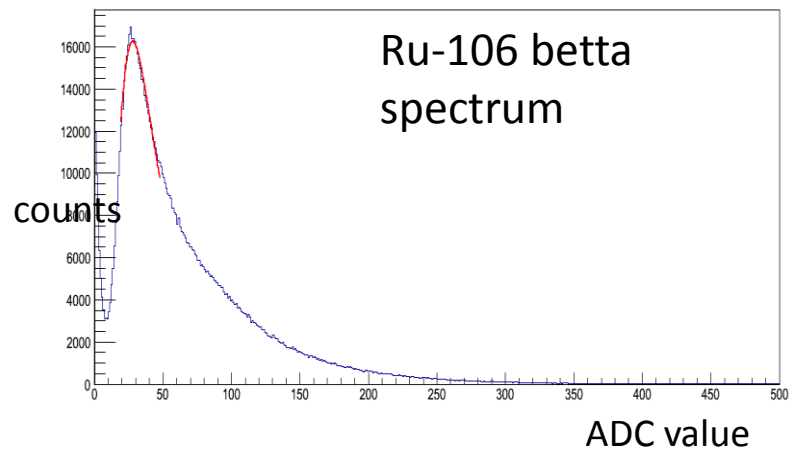
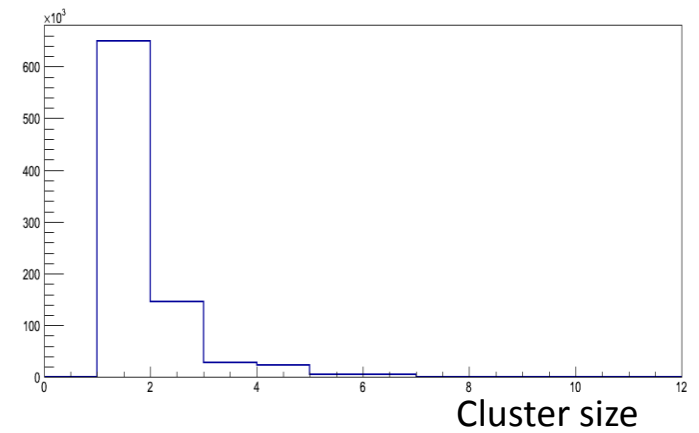
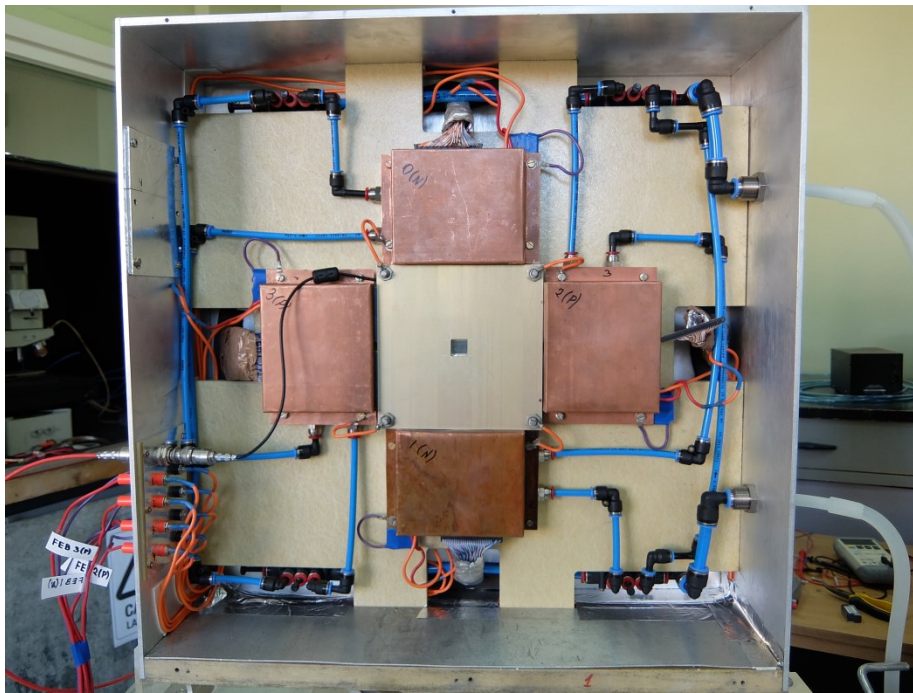
High voltage power supplier:  
Keythley 6487

Water cooler  
Lauda Alpha ra8

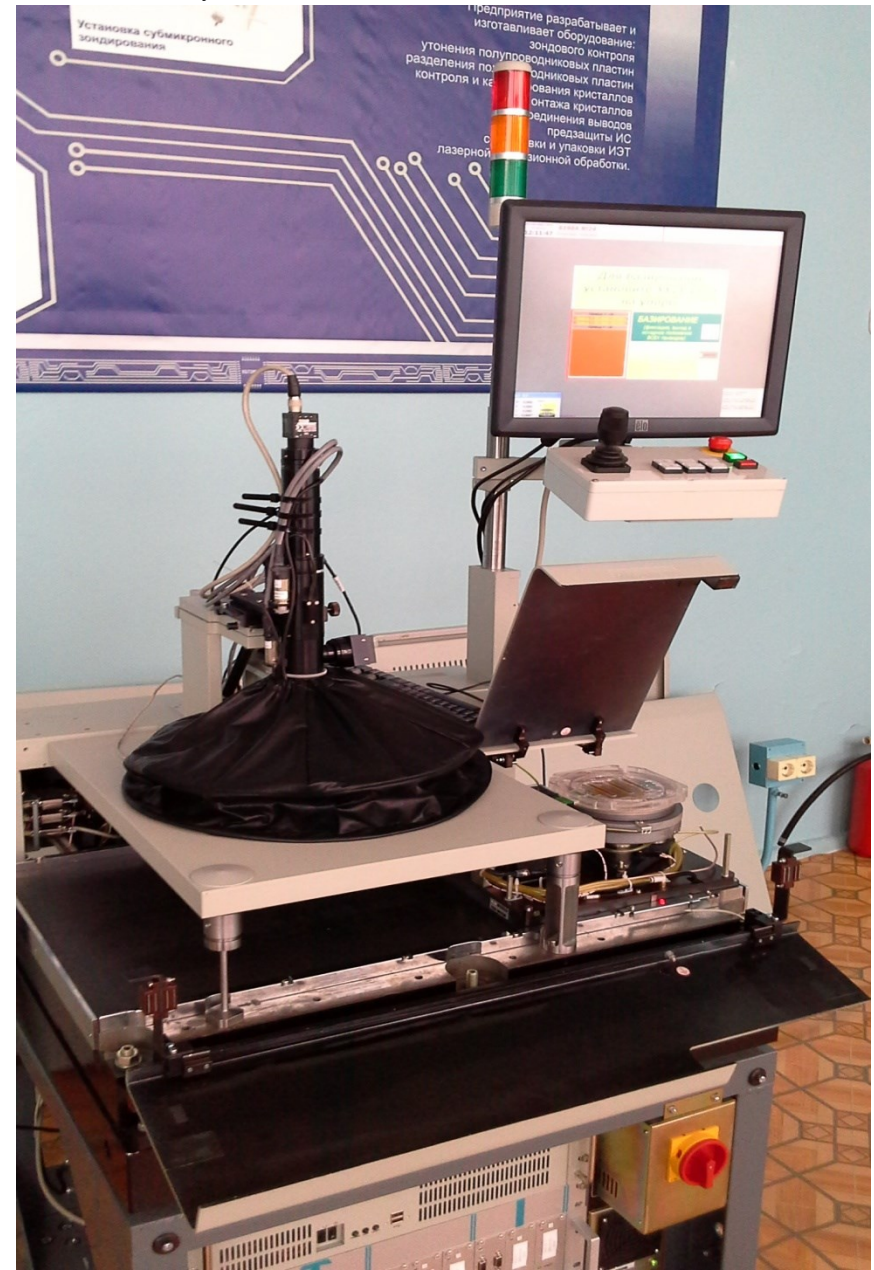
Trigger system based on scintillators





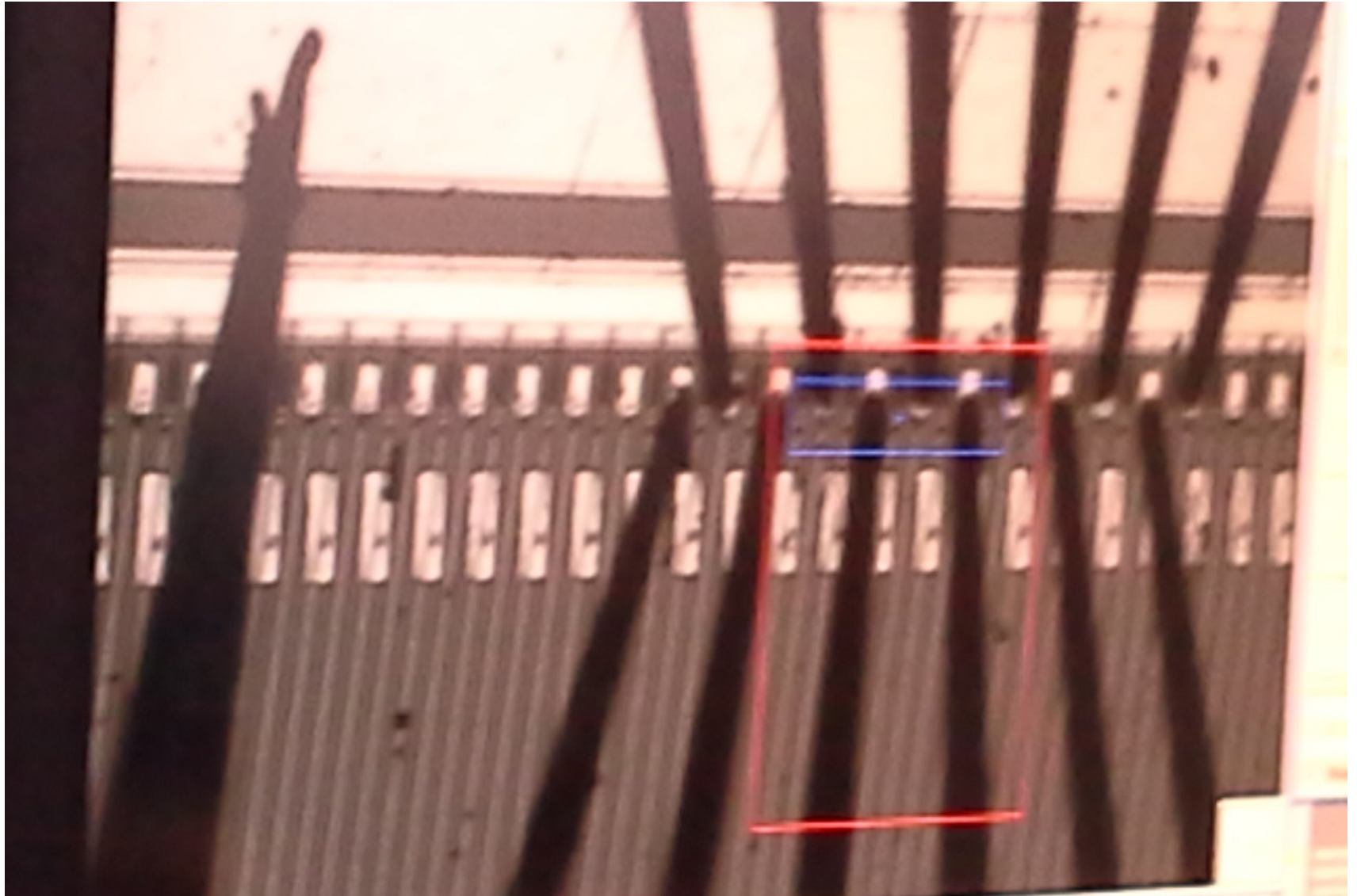


# DSSD automatic probe station (together with SINP MSU and PLANAR)





12 probes scanning the pads of DSSD





# Plans beyond 2015

**Motivation:** towards BM@N & CBM STS production readiness! Construction of 2 small stations for BM@N and mCBM@SIS18

## AT JINR:

- Installation of CF frames lamination, cleansing and painting lab at VB LHEP
- reaching the expected productivity of modules assembling by one shift of 4 persons - 16 modules/month
- Development and production of ladder assembly device
- Commissioning of the STS Nuclotron in-beam test area

## NEEDED FROM GSI:

- deployment of ASICs, FEBs parts and its container
- development and deployment of test stands for quality assurance of the produced modules and ladders

**CREMLIN goal:** additional funds for networking, support of the young scientists and technicians