Design and alignment accuracy of mechanical support for BM@N Si-subsystems

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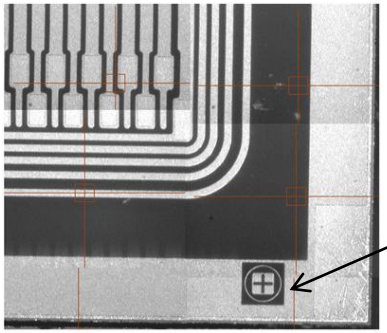
Design and alignment accuracy of mechanical support for BM@N Forward Si tracking detector planes

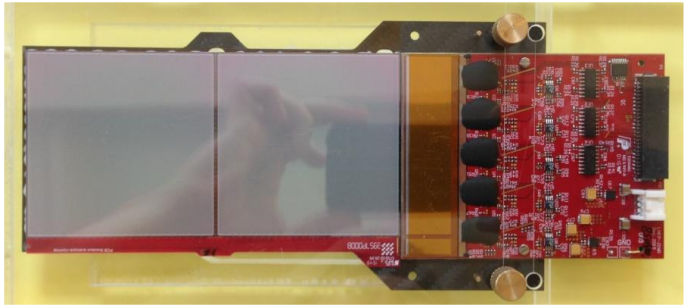
Contents:

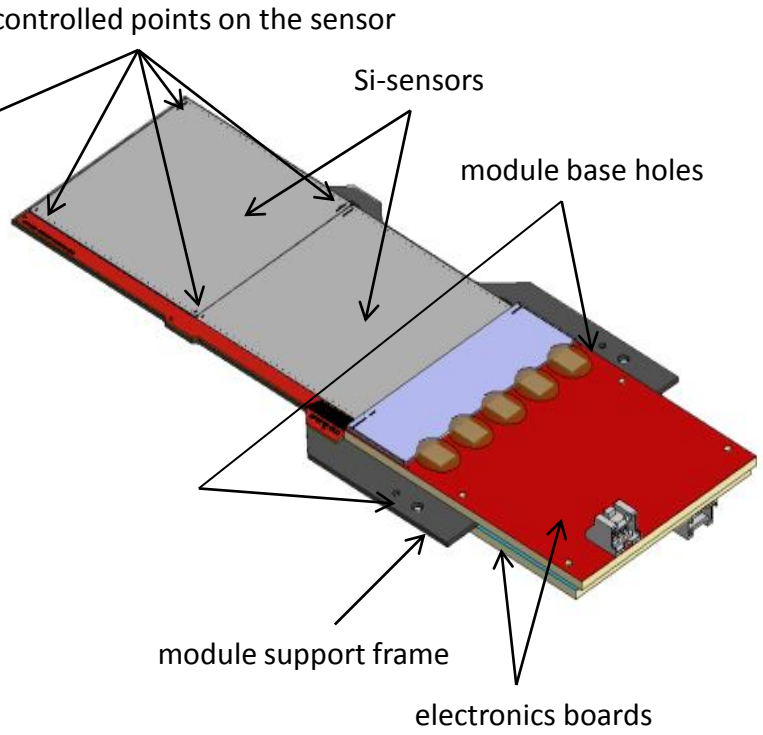
- Design and assembling of Si sensors modules used in the detector. Accuracy of module assembly.
- Design of the detector half-planes. Measurement and specifying the position of modules using a measuring microscope.
- Installing the half-planes in the magnet. Gaps between the casings and the ion pipeline. Determining the position in space.
- Conclusions

Design of Si sensors modules used in the detector.

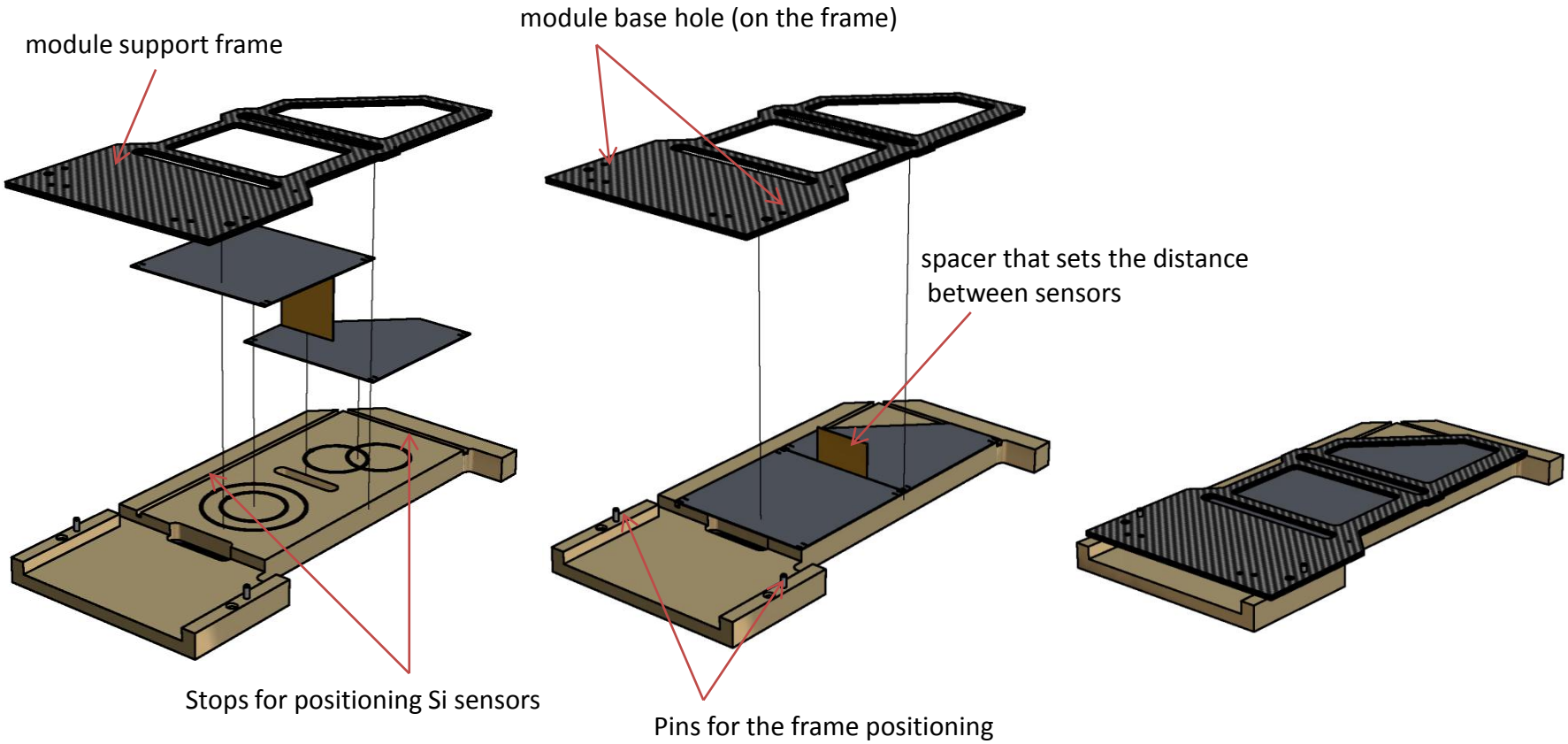
Si-sensor is made by photolithography with absolute accuracy of the strips position





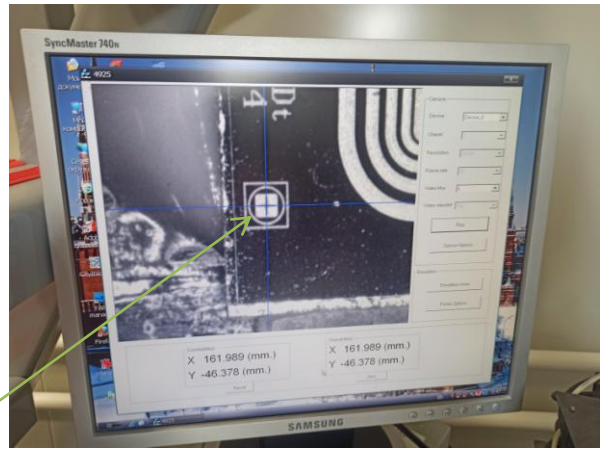


Si sensors positioning relative to the base frame holes during the Si sensors module assembling



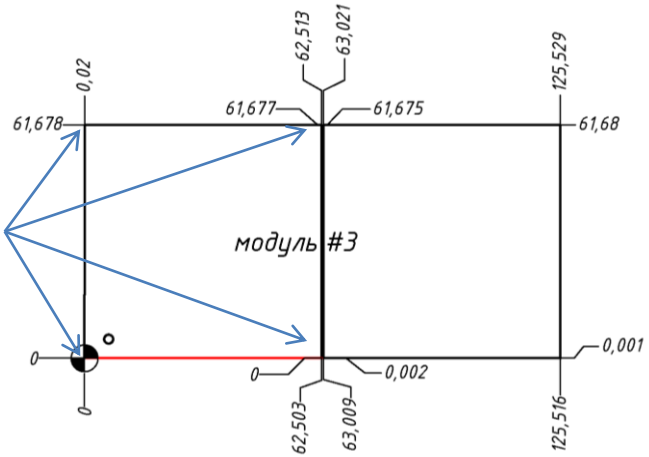
Accuracy of the modules assembly.

Measuring microscope ЭМ-4925
(working field - 168 mm x 320 mm)

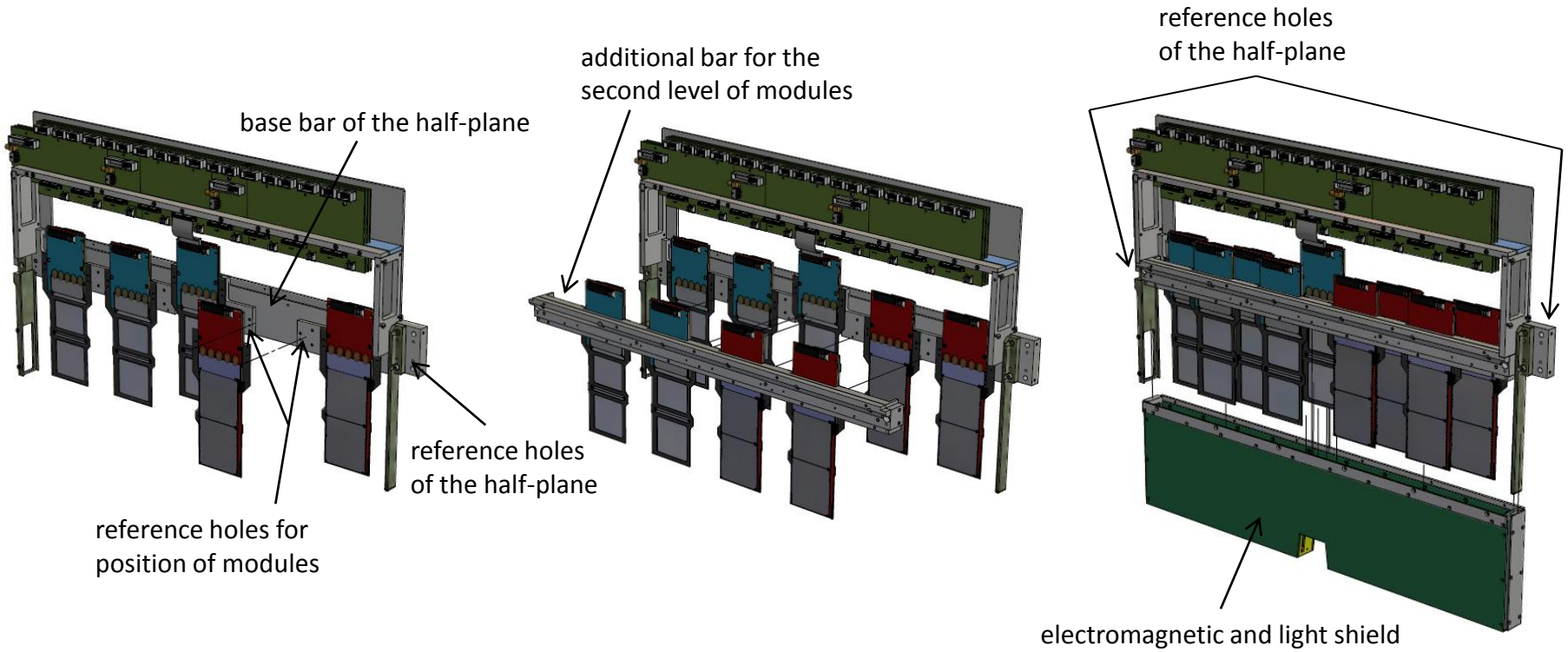


Ccontrol crosses
on the sensor

Position of control
crosses on the sensor

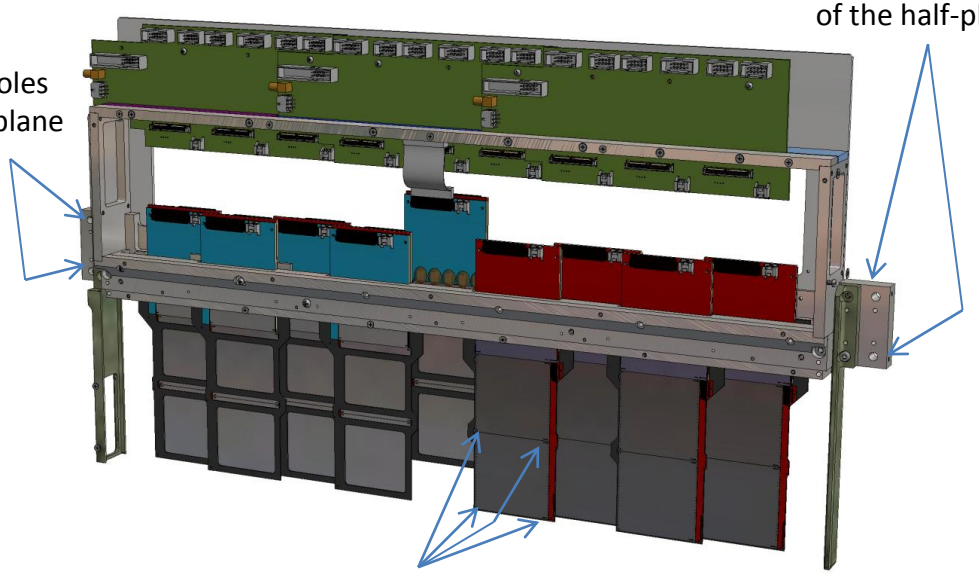


Half-plane assembly. Modules positioning in the half-plane.



Measuring microscope for specifying the position of modules in the half plane.

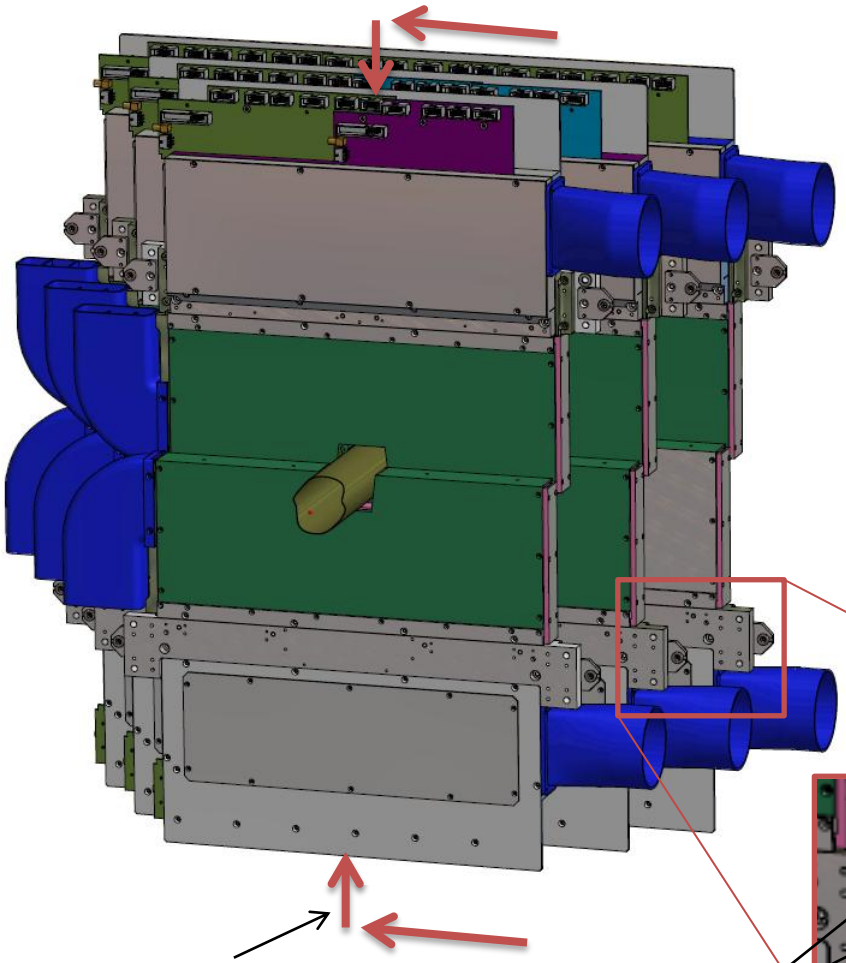
Микроскоп видеоизмерительный MBZ-500(TT)
Производства компании ПРОФНОВАТОР (Россия)



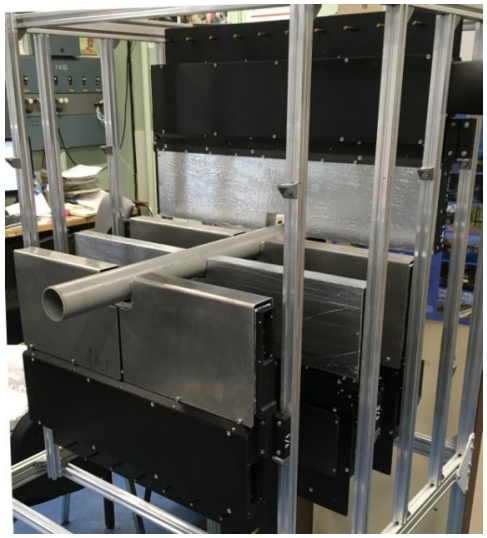
Метрологические и технические характеристики

Наименование	параметры
Диапазоны измерений длины:	MBZ-500(TT)
- по оси X, мм	500
- по оси Y, мм	400
- по оси Z, мм	200
Цена единицы наименьшего разряда при измерении длины, мм,	0,0001
Пределы допускаемой погрешности, мкм ***(модификация TT)***	
– в направлении одной оси (X;Y)	±(1,5+L/100)
– в плоскости двух осей (X,Y)	±(2,5+L/100)
– в направлении оси Z**	±(2+L/100)

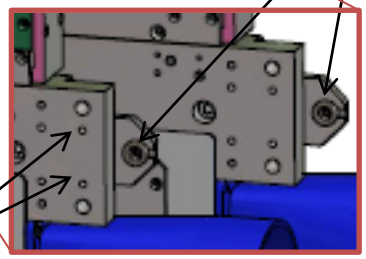
Installing the half-planes in the magnet. Gaps between the casings and the ion pipeline. Measuring the position of the reference points in space.



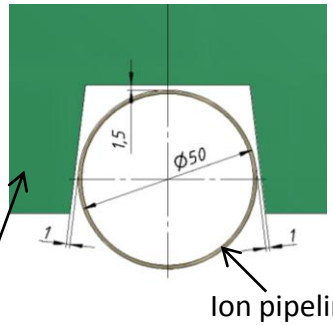
trajectory of installing half-planes using linear guides of the support structure



control marks for geodesic measurement installed on the reference holes of the half-planes.



reference holes of the half-plane



Ion pipeline

The half plane electromagnetic and light shield

Conclusions

- The relative position of Si sensors in the module without errors
- The position of the modules in each half plane will be measured and specified
- The main criterion for placing the half-plane in the magnet is the position of the ion pipeline
- Points on the half-plane bodies for control marks of geodesic measurement were determined
- Design of mechanical support for the half-planes of Forward Si-tracking in progress