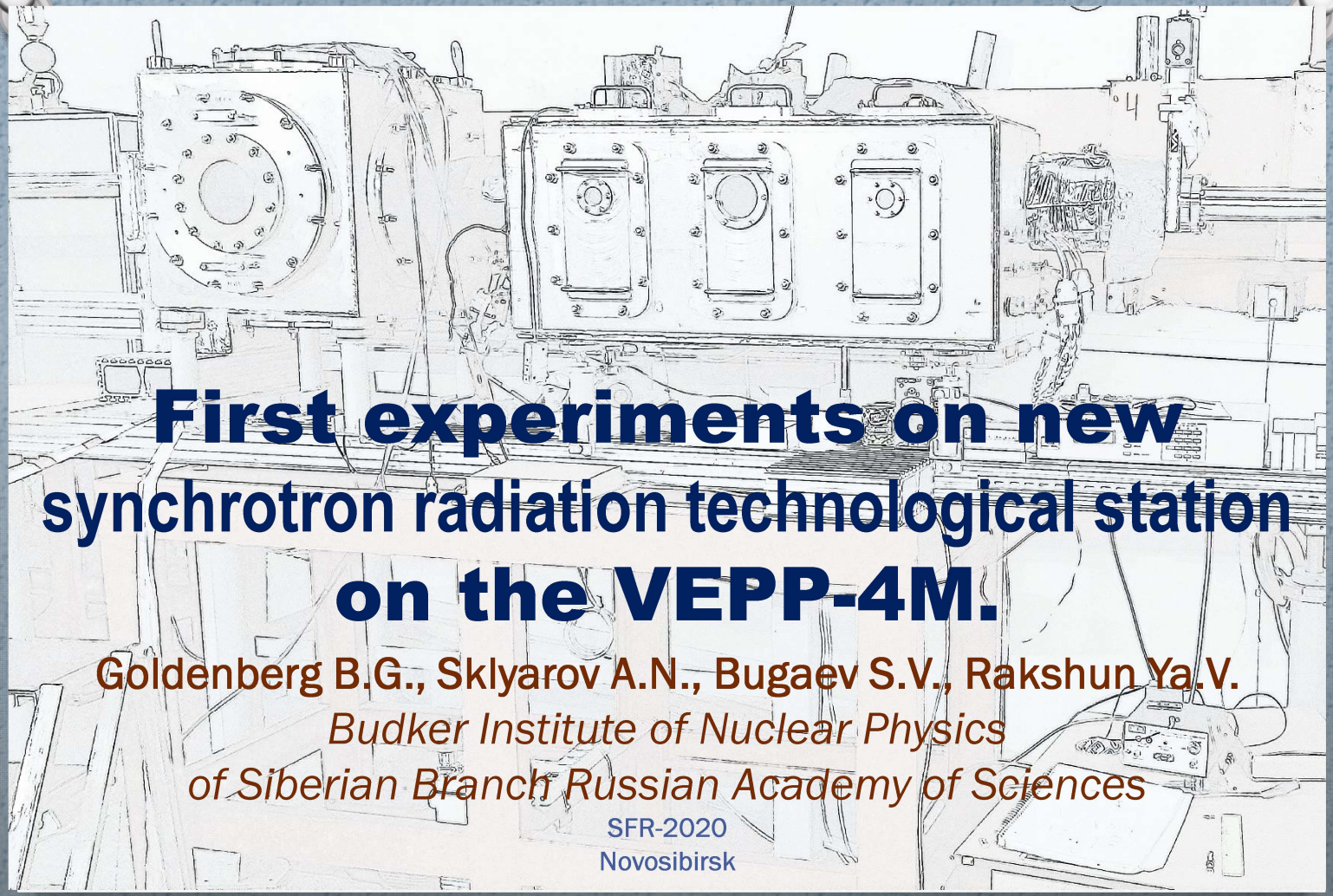

First experiments on new synchrotron radiation technological station on the VEPP-4M.

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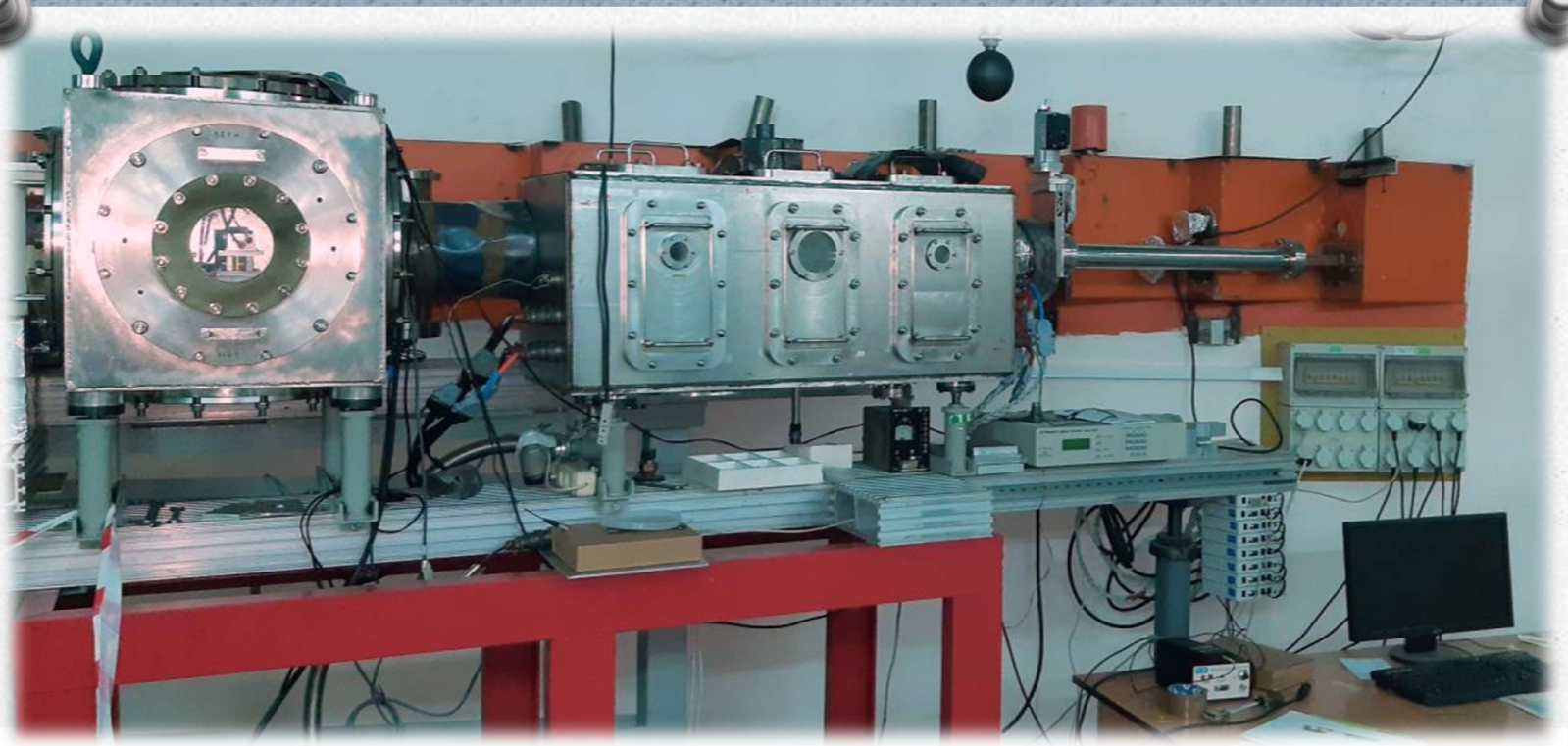
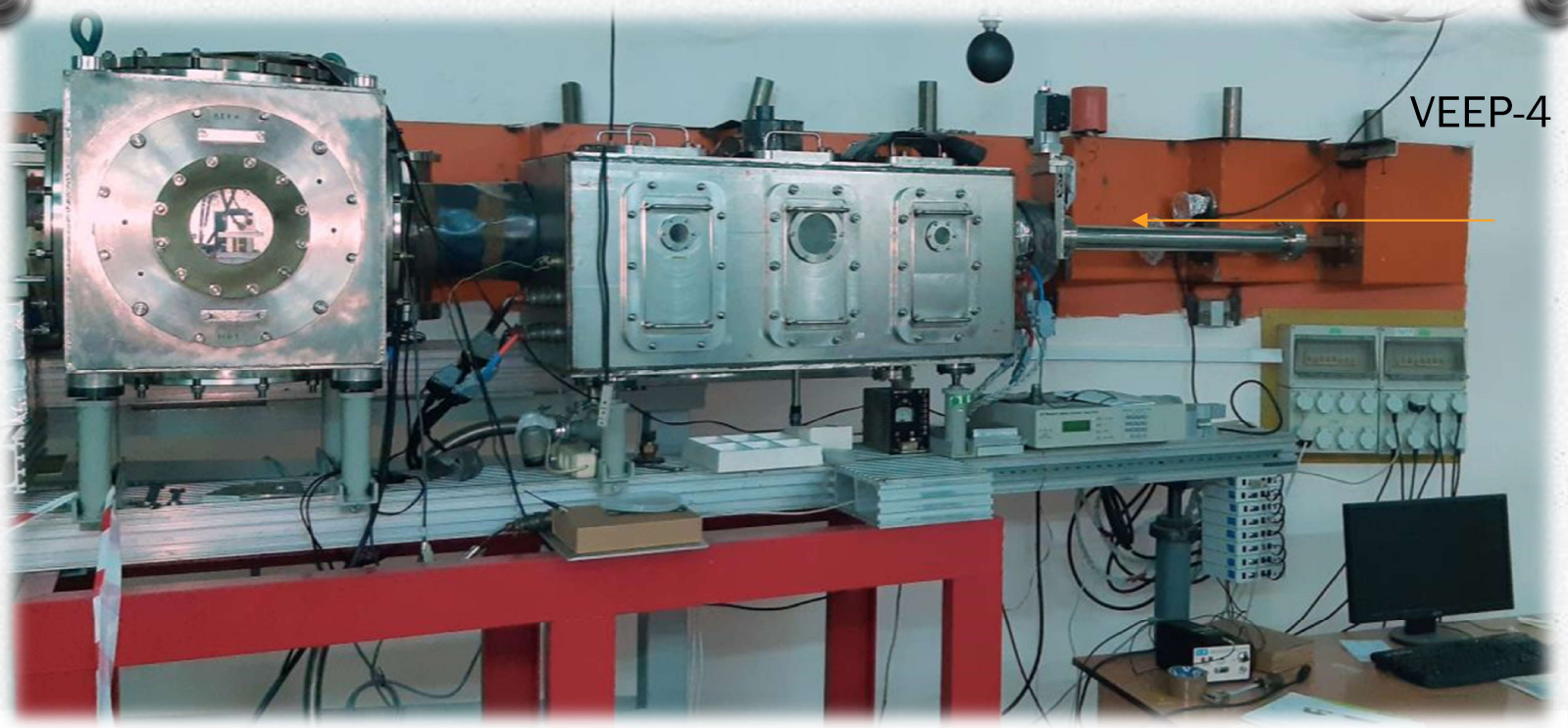
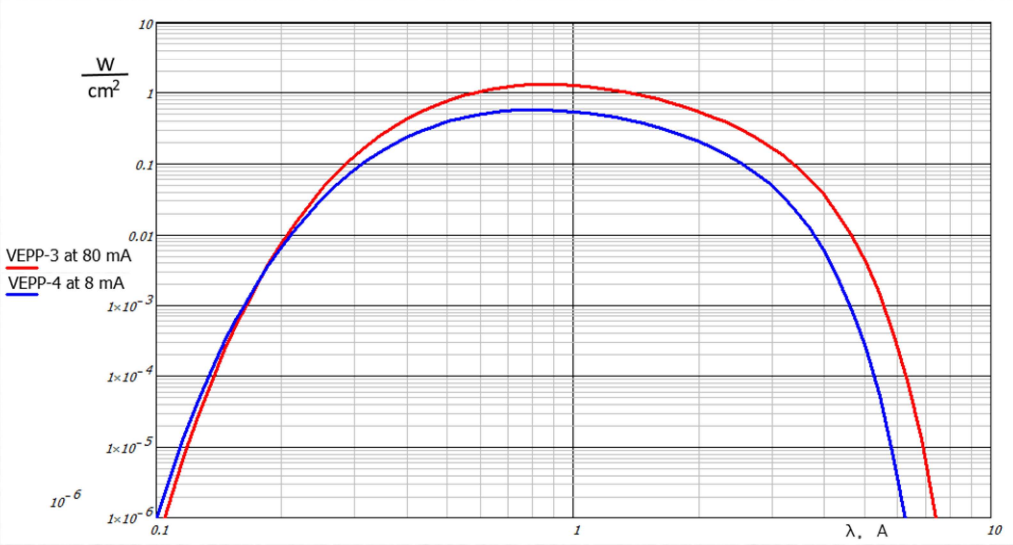


A new synchrotron radiation technological station at beamline #1 from the VEPP-4M storage ring was constructed and experimental work started. The station is intend for practical training of students to carryout experiments on synchrotron radiation. The modular concept of construction of station allows us to put station in to operation in stages, also it allows us to realize various research methods. The article presents the design of the station, SR beam characteristics and test experiments on X-ray fluorescence analysis.



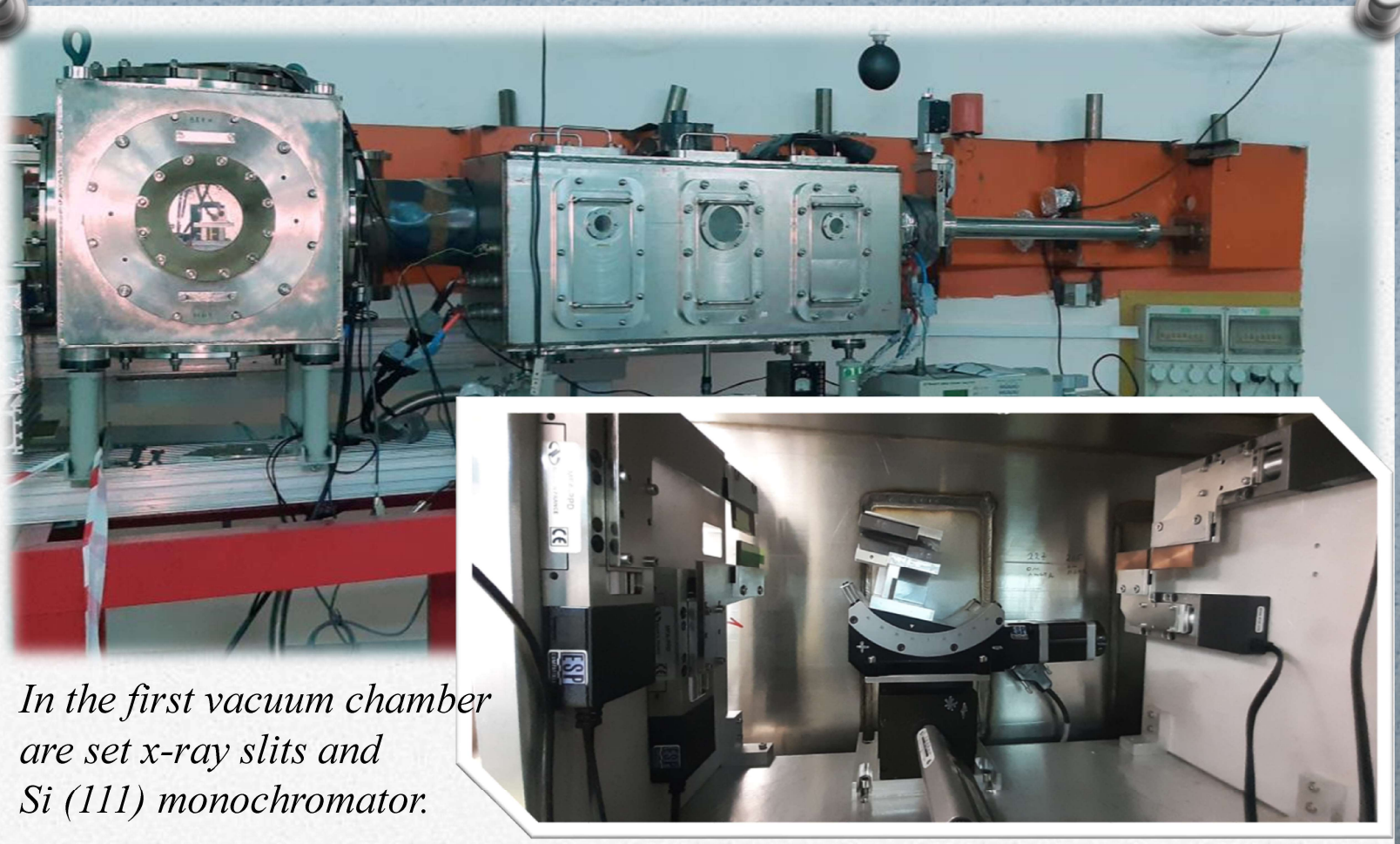
The *N10F* deflecting magnet at VEPP-4 storage ring is the source of radiation for the station. The electron energy in VEPP-4 was 4.5 GeV and magnetic field at point of radiation was 4.34 kG. The 4 beryllium foil of 200 microns each are installed in the beamline for vacuum protection of the storage ring.



The spectral characteristics of the SR beam at the new station are comparable to the SR characteristics of the VEPP-3 beam.
At the same time, the integral flow at the new station is 4.5 times lower than at the VEPP-3 station, under typical experimental conditions

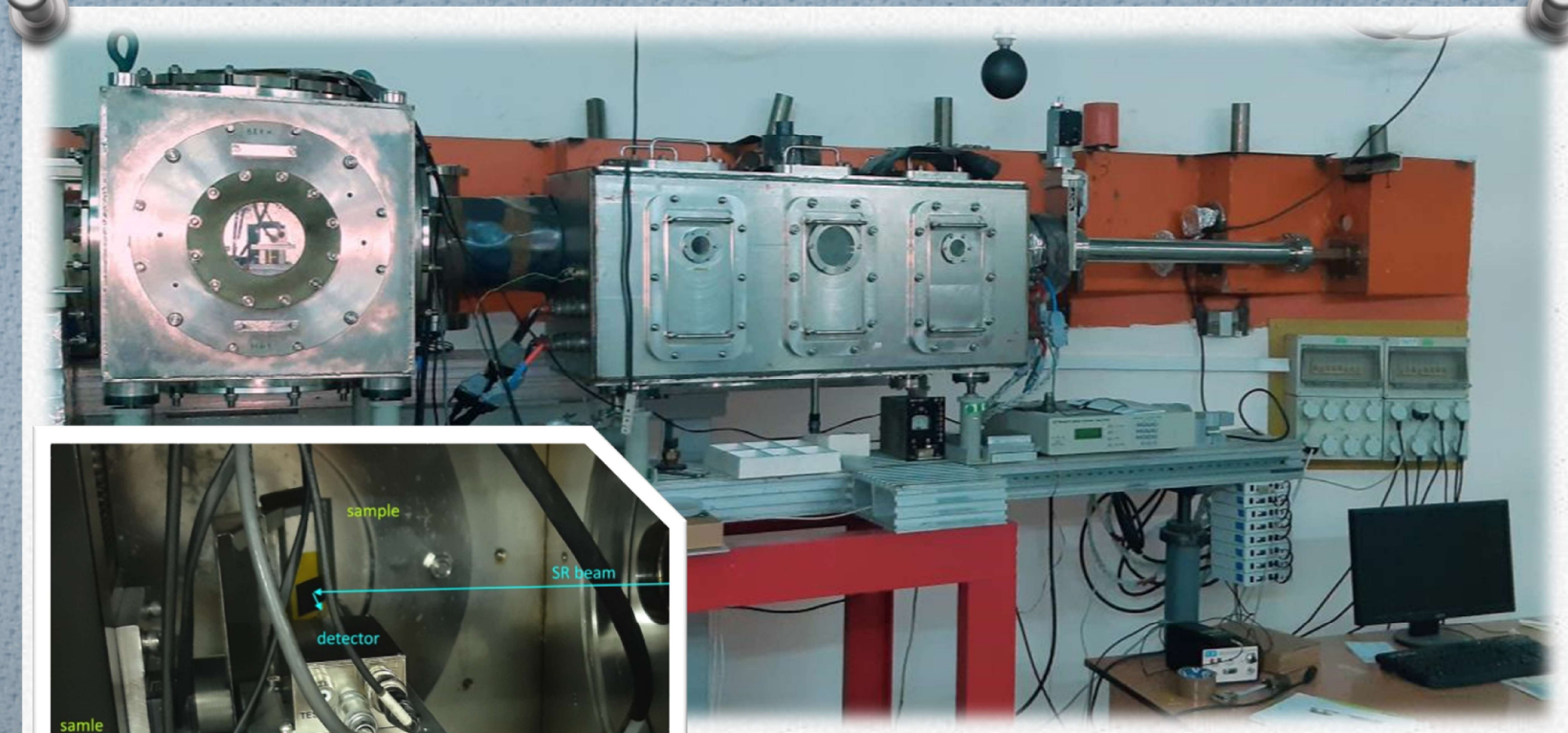
The spectrum of radiation incident on the sample in the median plane is calculated under typical experimental conditions:

	VEPP-3	VEPP-4
E, GeV	2,0	4,5
H, kG	20	4,34
I, mA	80	8
Be foil	500	800
Distance, m	20	21



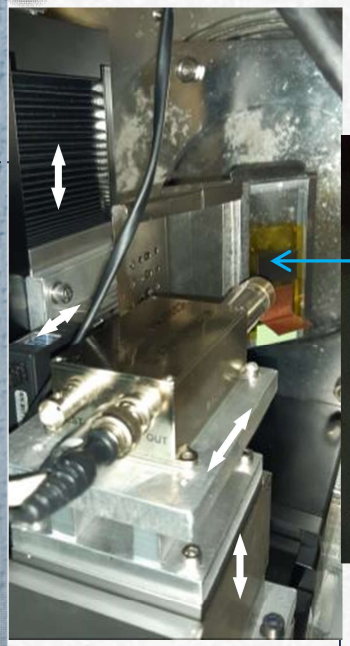
In the first vacuum chamber are set x-ray slits and Si (111) monochromator.

Here we study the spatial distribution of the SR beam, the control of the beam shape, and the basics of using a two-crystal monochromator.

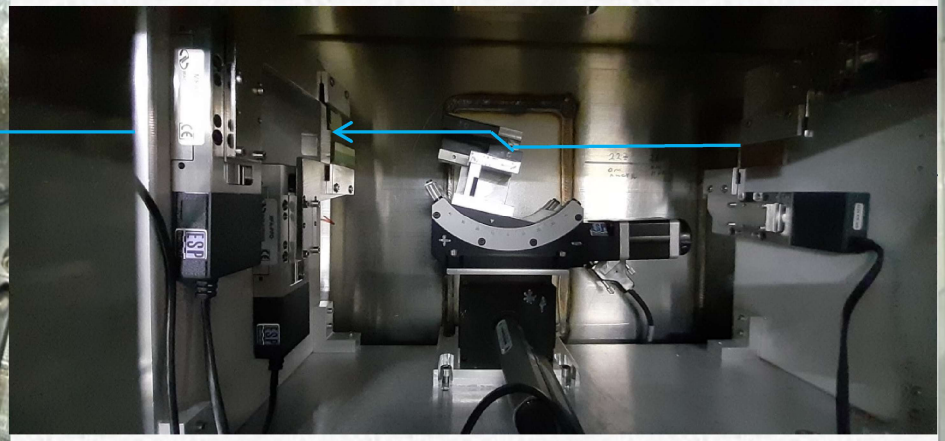


In the second vacuum chamber, a set of motorized stages is installed to execution various experiments.

The first implemented experiment was X-ray fluorescence. An amptek XR-100 R detector and a copper foil test sample are installed on motorized stages.

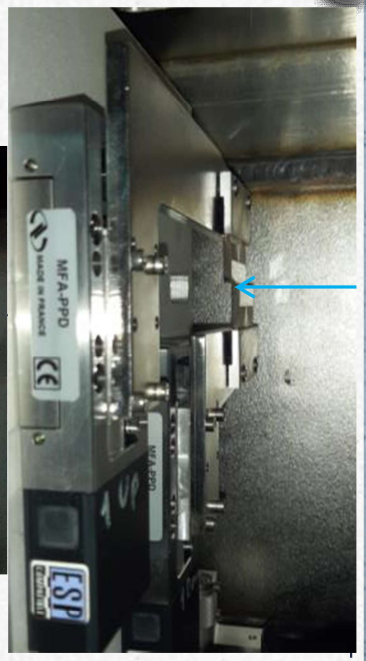


Object and
XRFA detector
(second chamber)



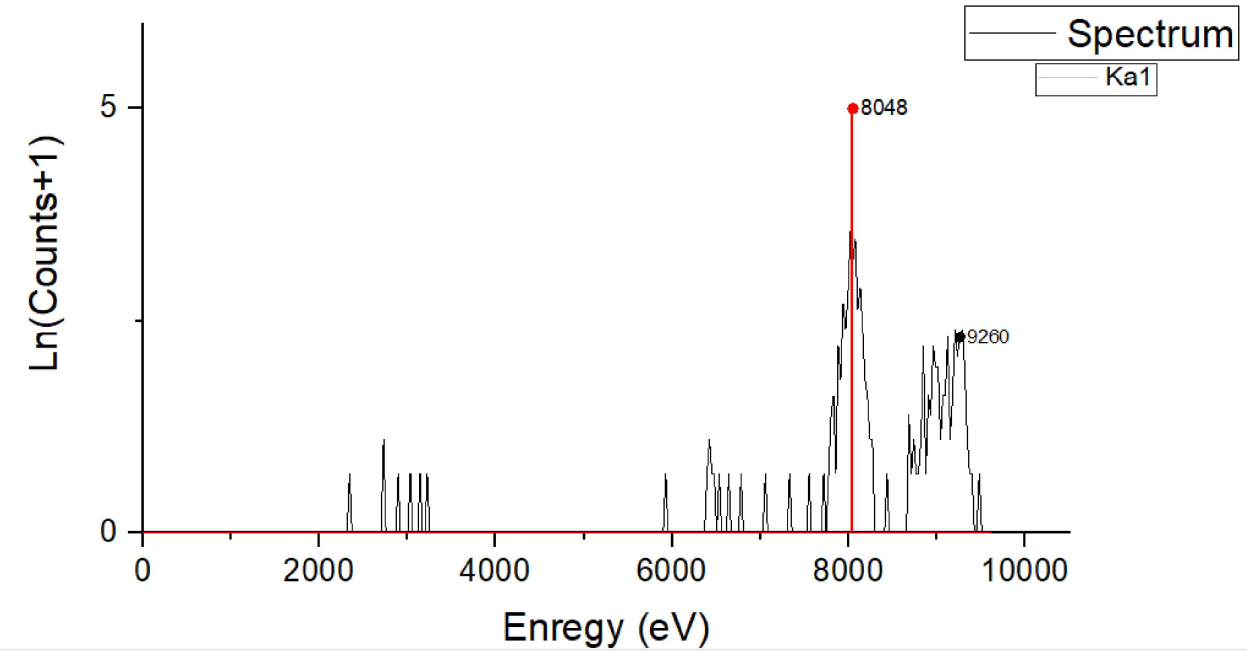
dual-crystal
monochromator

(first chamber)



Entrance slits
(horizontal and vertical)

In the first test experiments, the method of x-ray fluorescence analysis using a silicon energy-dispersion detector was studied . The detector operated in 512 channel mode. The spectrum was shot for 180 seconds. In the chamber of the monochromator, the pressure was reduced to forevacuum. Copper foil was used as a test sample.



Spectrum calibration was performed in 2 iterations: First, the energy range of the fluorescent peak was determined based on the approximate position of the monochromator, then the center of the peak was taken as a point with the energy K_a of copper.

Figure shows the XRFA spectrum, which clearly shows the peak of elastic photon scattering. There is also a bright characteristic K_a-line of copper.

- Of course, the XRFA results demonstrated are far from ideal, however, it is important to note that the main function of the station is already being implemented. Students of NSU and NSTU actively participate in debugging the station's equipment and conducting experiments, getting practical experience with synchrotron radiation.

To be continued…