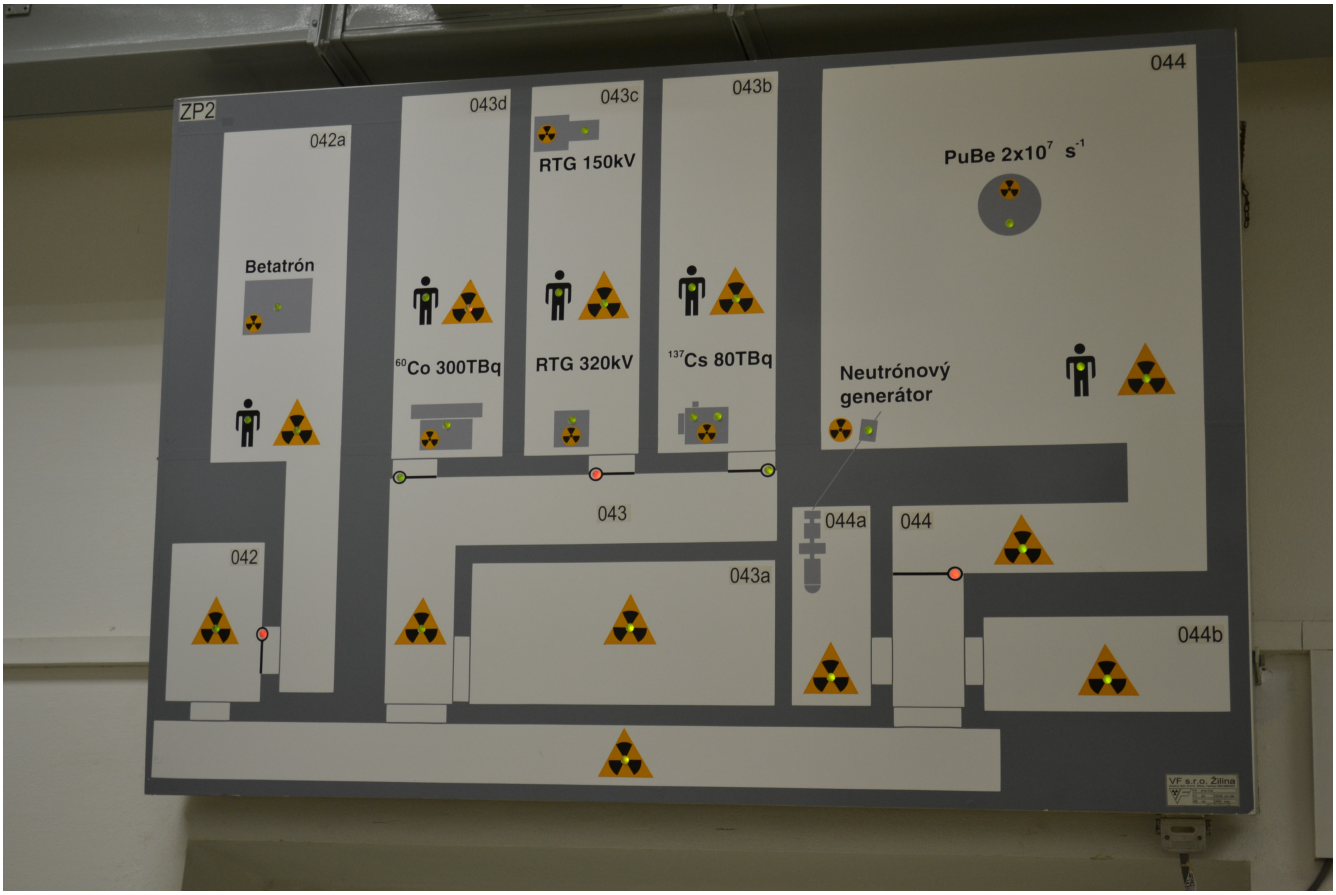
Visit at the Metrological Institute in Bratislava

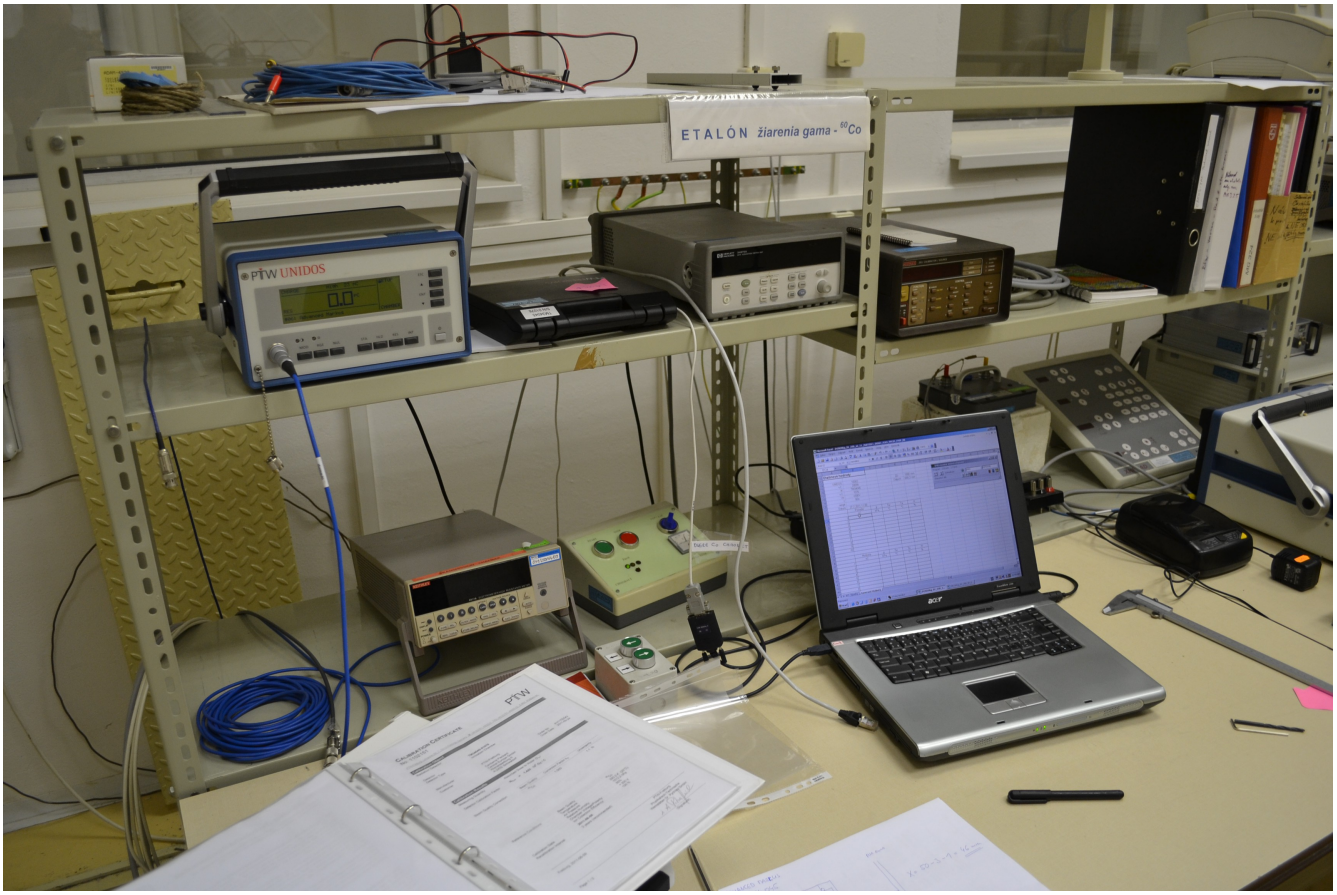
Primary standard lab of Slovakia, offer a broad range of calibration services.

Roos ionization chambers from PTW, well suited for measuring depth-dose curves of pencil shaped ion beams.

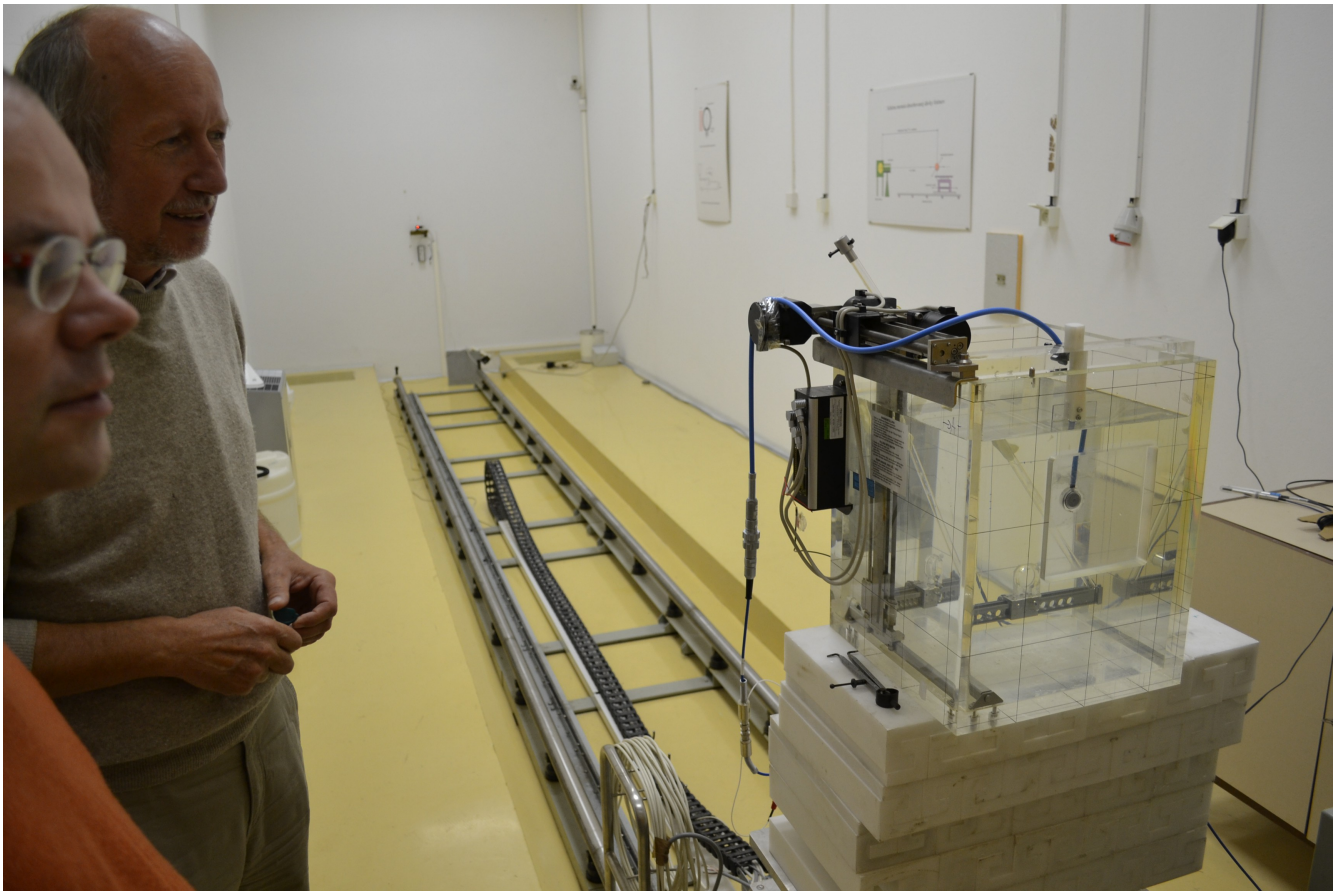


Layout of the irradiation facility, they have a betatron, a Co-60 unit, a 320 kV X-ray unit, a Cs-137 irradiator and a neutron room with various neutron sources.

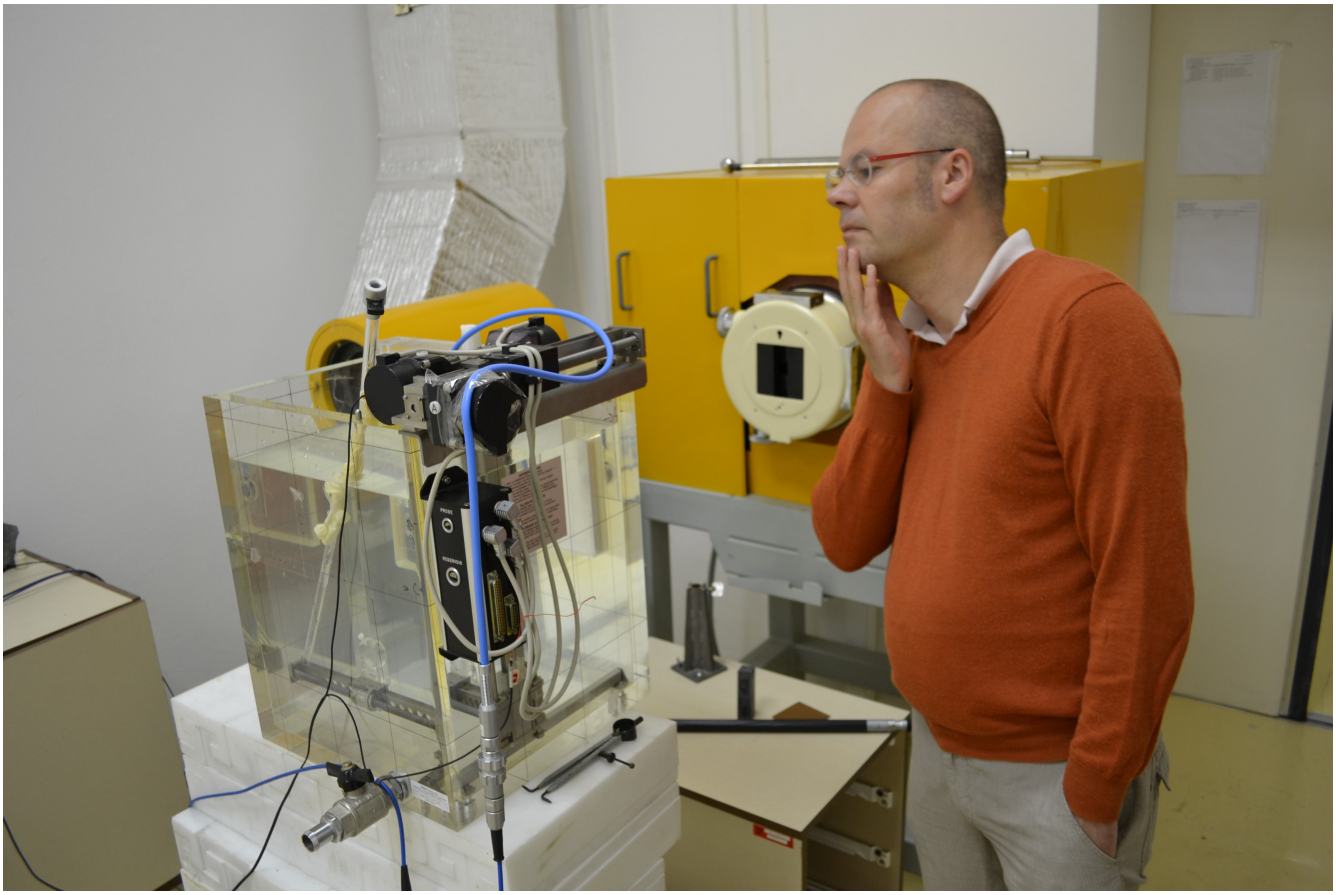
Models of Cs-137 sources (these are not radioactive ;-).



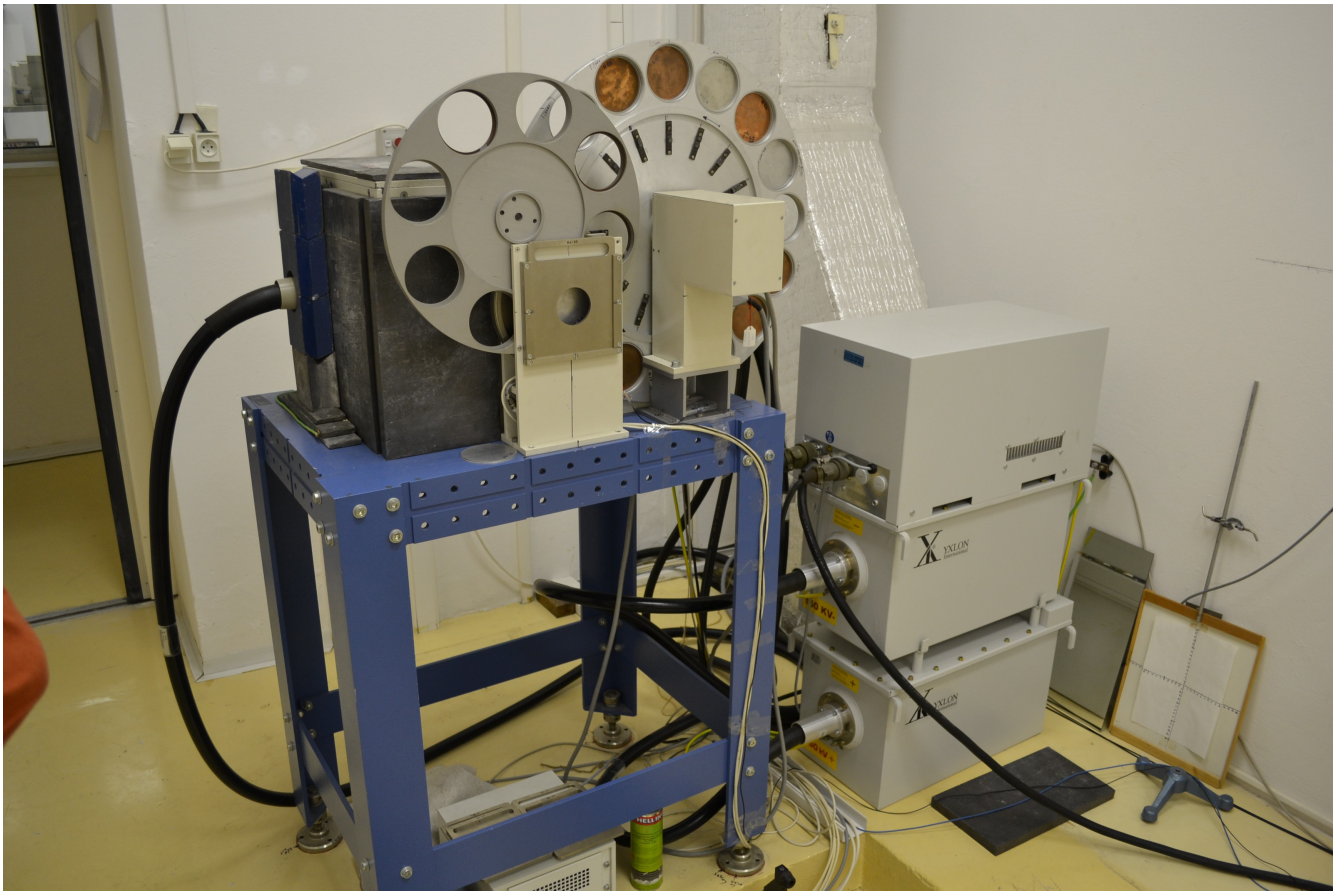
A part of the control room, with the very well known unidos by PTW which I have worked a lot with (e.g. at CERN).



In the Co-60 irradiation room. Water tank is here holding a Markus ionization chamber. The dose-rate can be reduced by increasing the distance to the Co-60 irradiation unit.



The yellow box holds the Co-60 source, behind the tank an additional collimator is visible which can be mounted in front of the Co-60 unit.

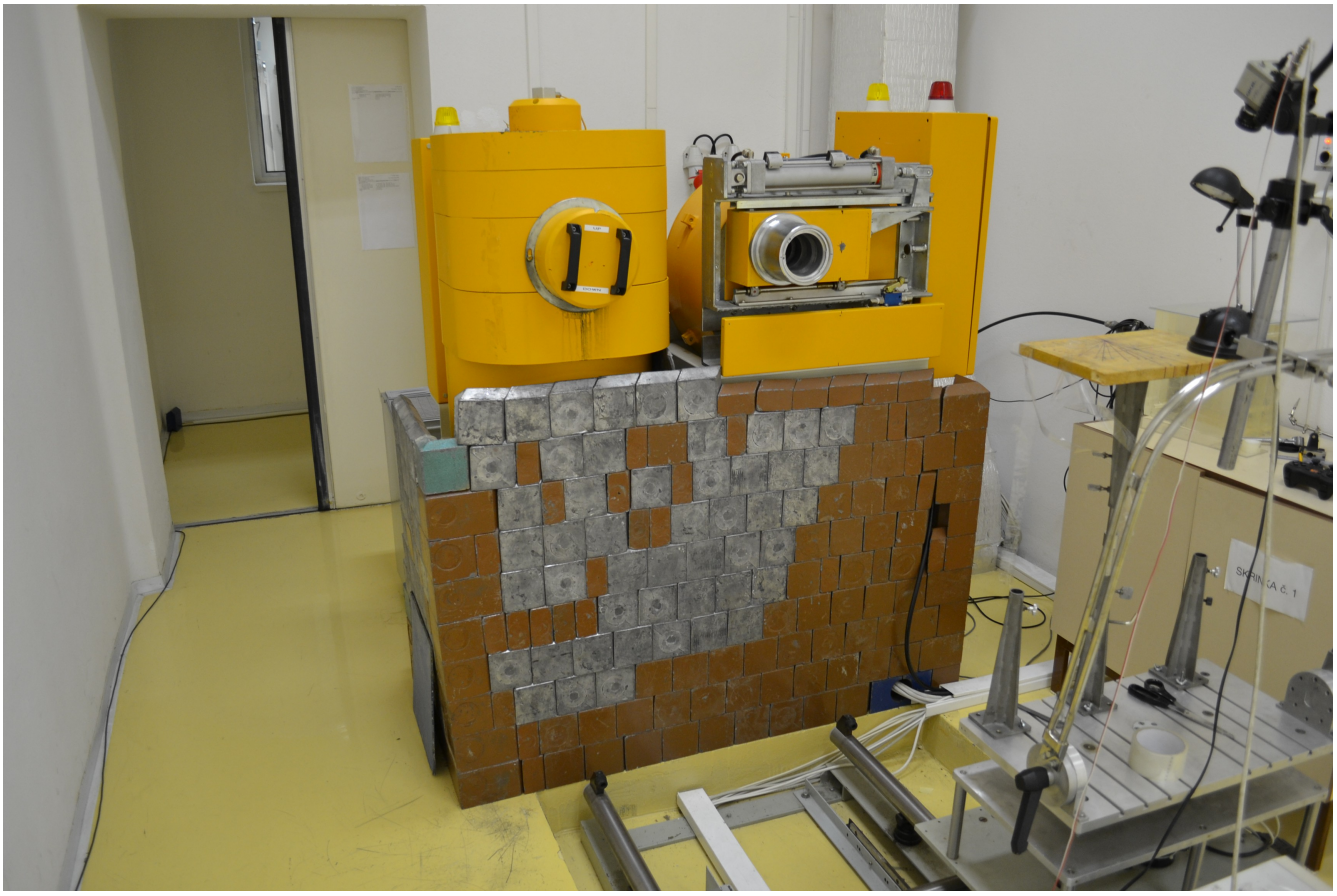


X-ray irradiation room. The X-ray device is shielded by lead, and various filters can be positioned in front of the X-ray device. Copper filters can remove characteristic lines of the X-ray spectrum.

The X-ray irradiation room, also featured a medical x-ray device.

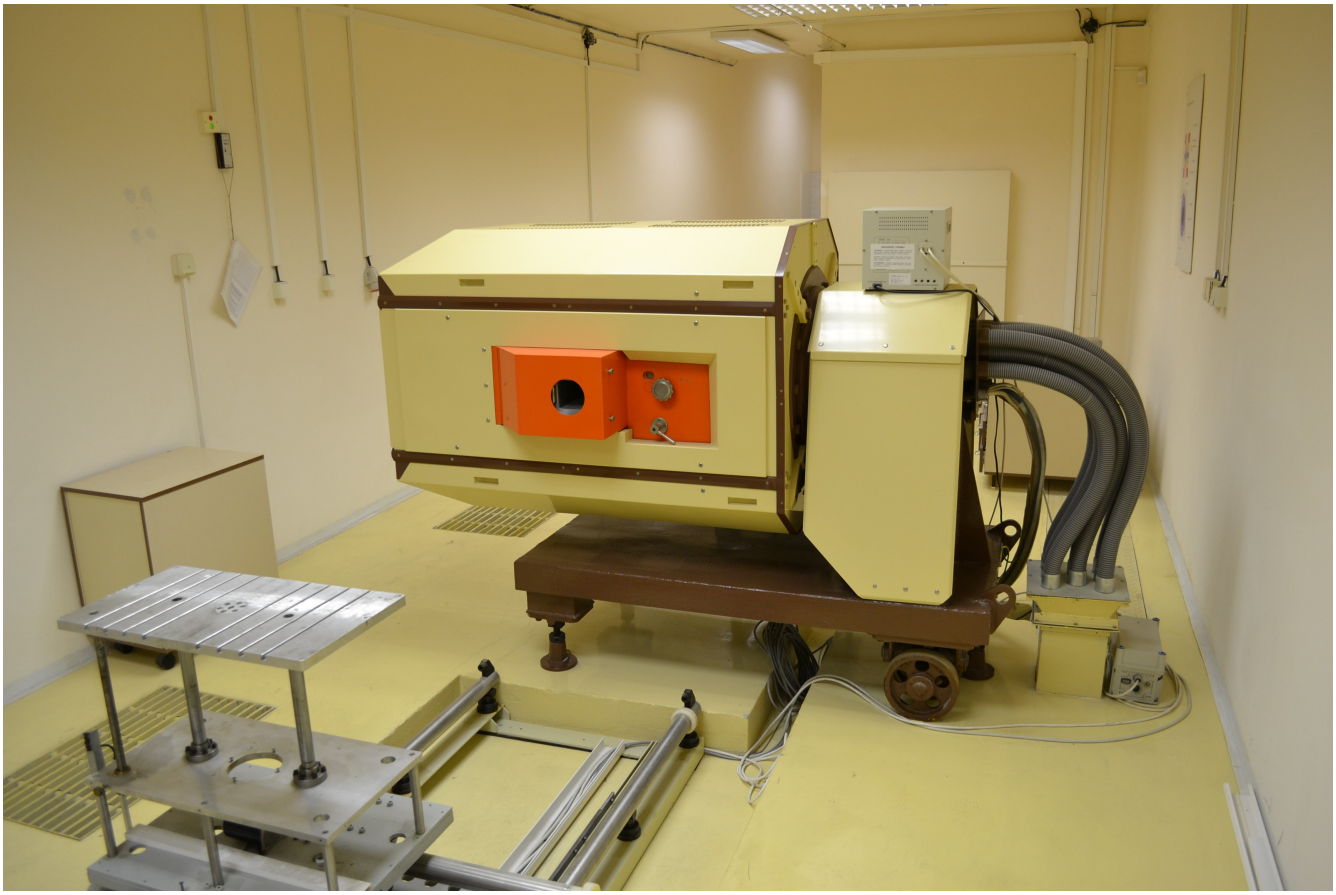
How to make 90 Volts... :)

Cs-137 irradiation room.



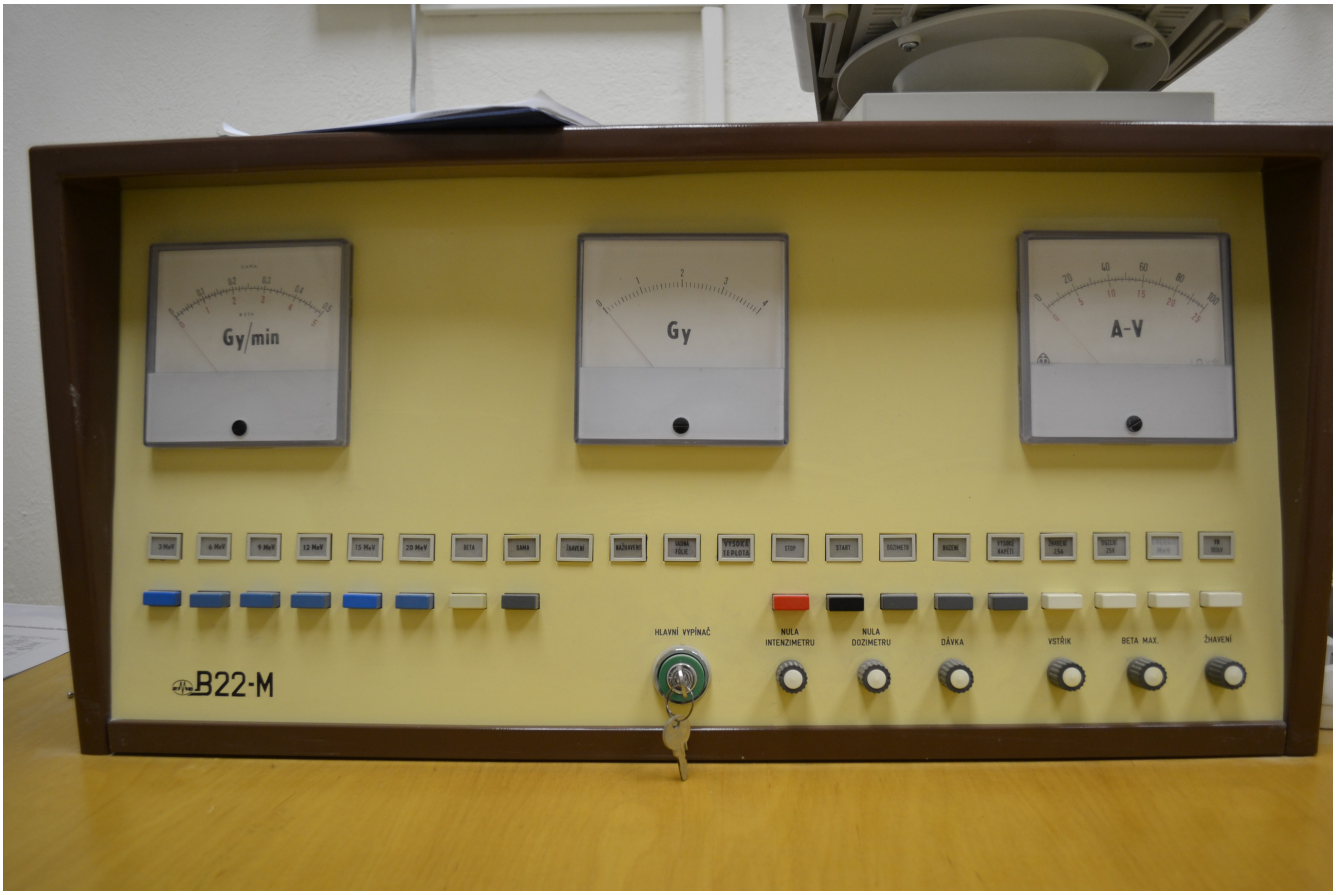
A real gem was the Betatron room: Czech construction, which can deliver both electron and photon beams

The betatron is an old design inveted by Norwegian Widerøe. Most betatrons have today been replaced by linacs (also invented by Widerøe, btw), so they are a fairly rare sight. In fact this is the second time I ever see a betatron, the first was at the physics department of the university of Freiburg, however that was not operational any more, as far as I know.



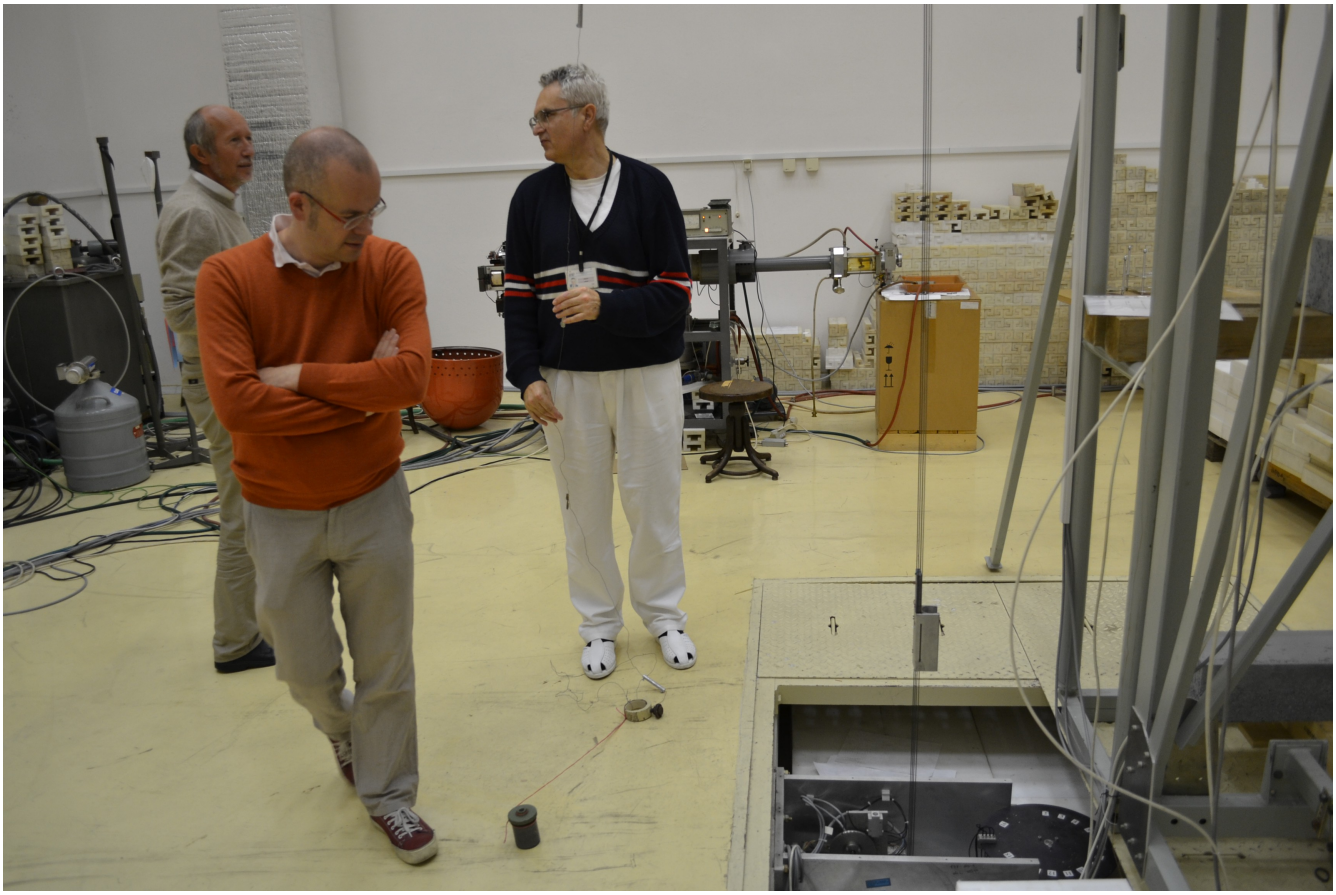
Back side of the betatron where photon beams can be extracted.

They even had a spare betatron tube, heavily tarnished by radiation damage to the glass.

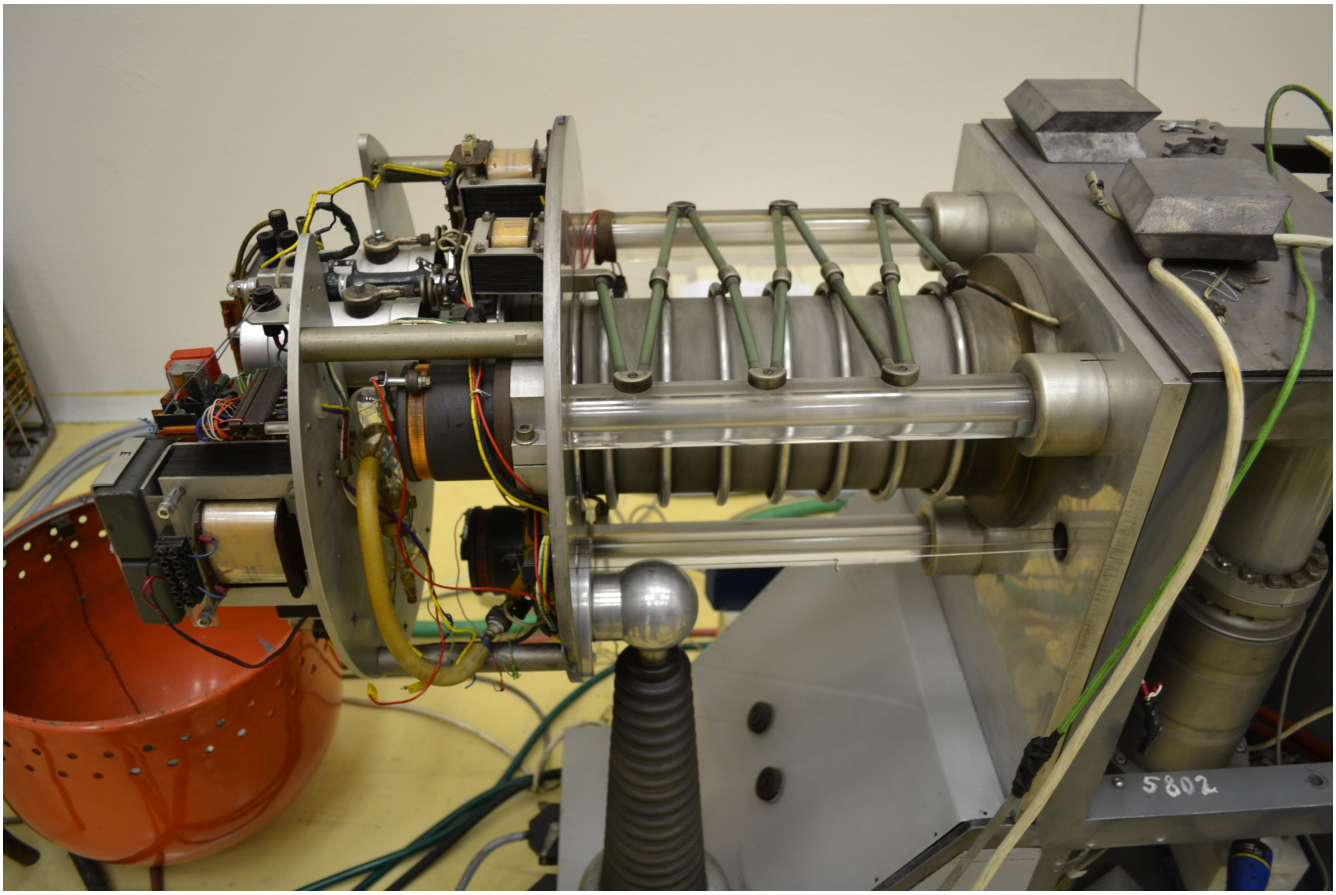


Control panel for the betatron.

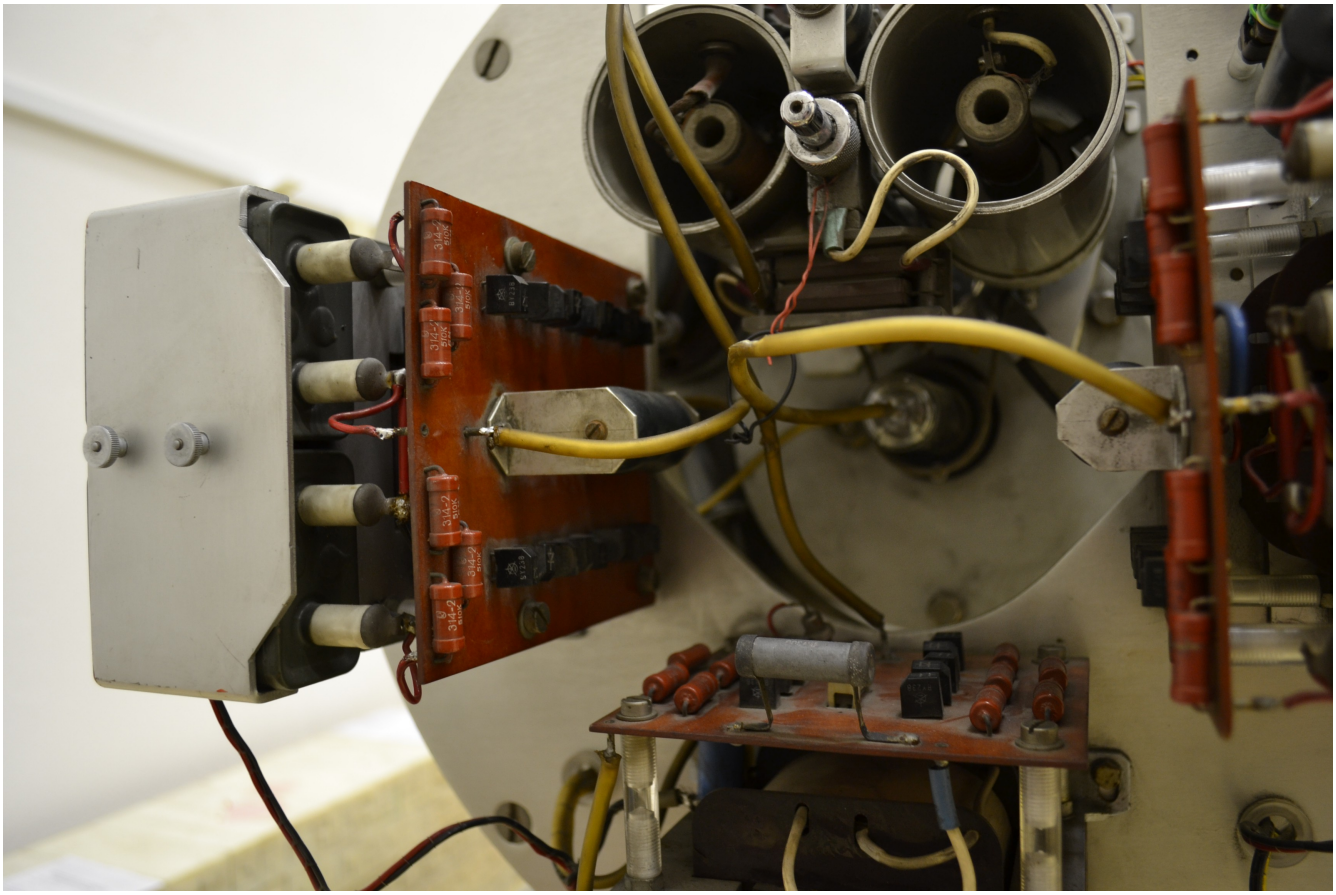
Powersupply and controls for the betatron. Many components are still genuine Czech, manufactured by TESLA.



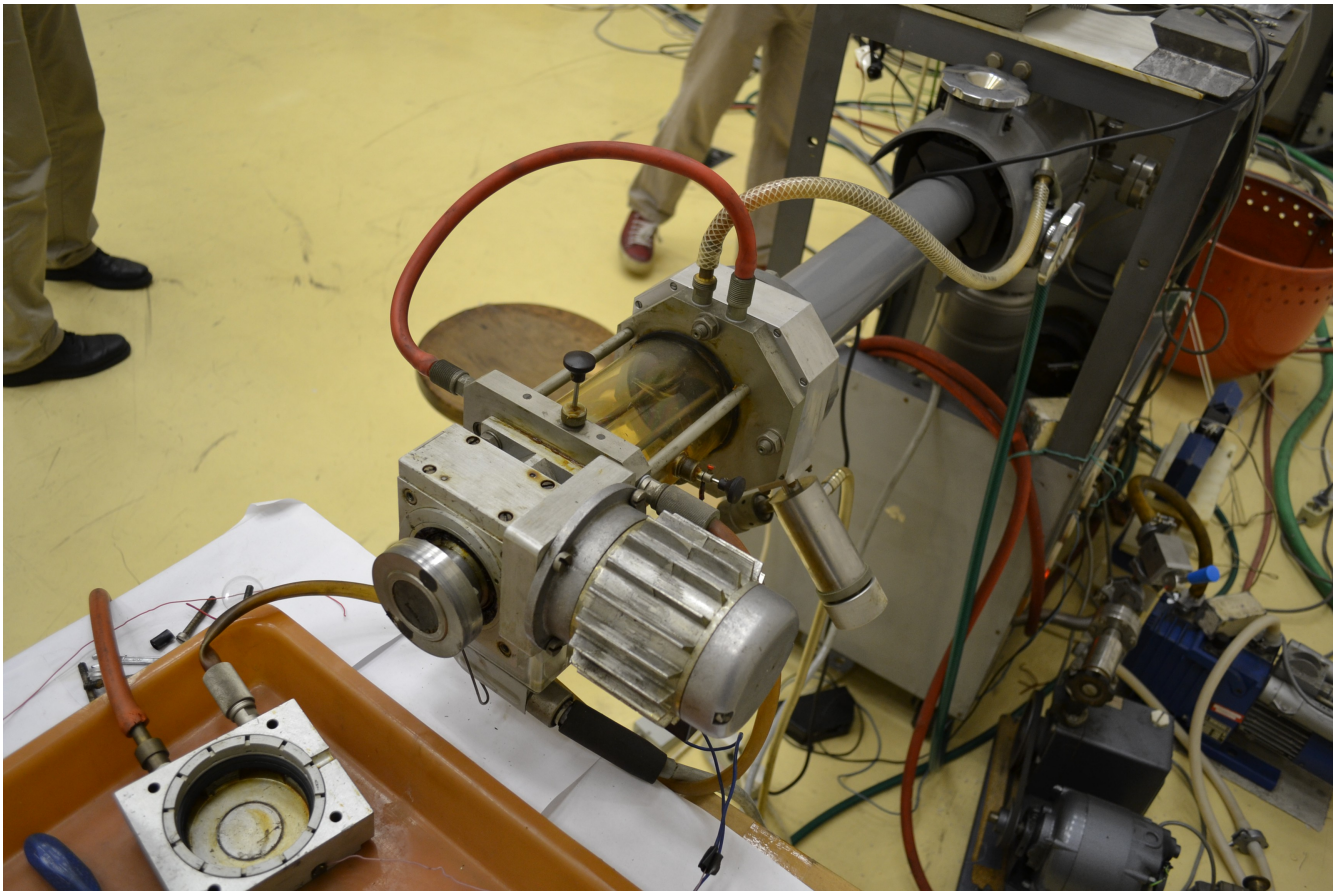
Neutron vault. In the floor several neutron sources are kept, and can be raised out of the cave by the visible holder. I was a bit hesitant, when the scientist suddenly pulled a string, and the holder surfaced out of the neutron cave. “Is it empty?!” “Sure its empty!”
In the cave they had a range of standard sources, mostly Plutonium or Americium mixed with Beryllium, and a single Californium source which fissions spontaneously.



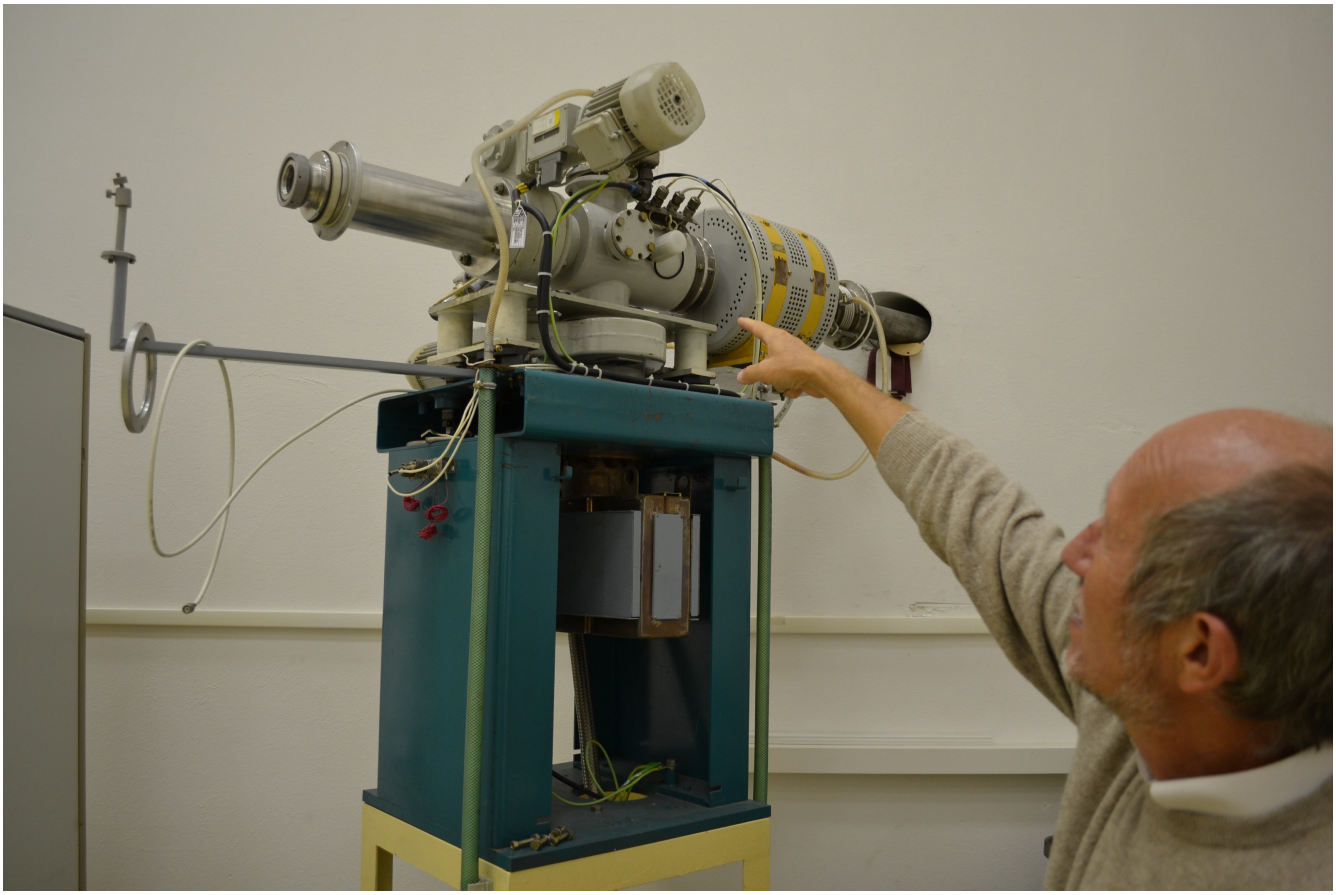
This accelerator was very cute: protons accelerated towards a Tritium target produces a neutron beam. The design of the high voltage terminal looks very much like the design found in the terminal of our Van de Graaf KN machine in Aarhus [LINK].



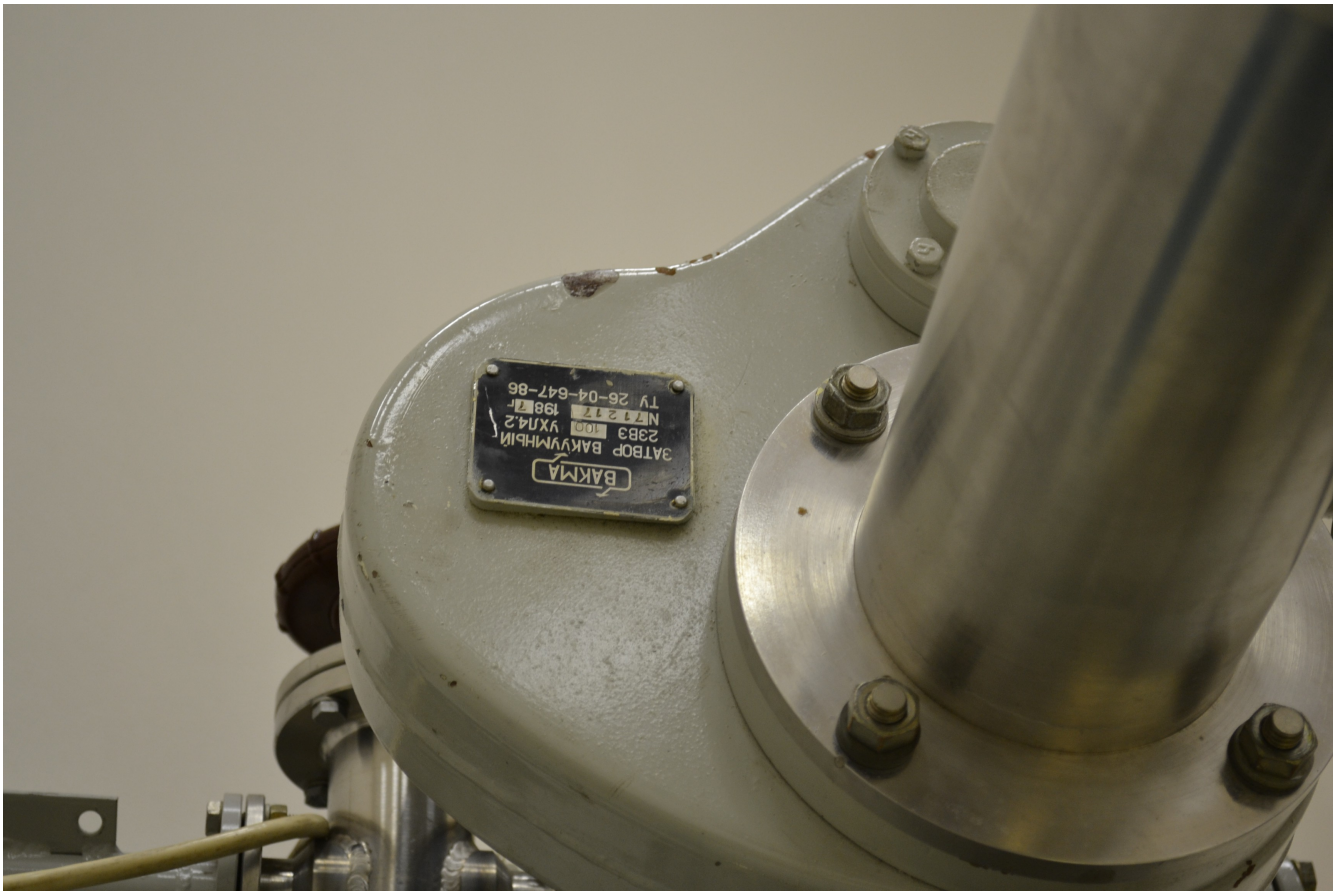
The ion source can be seen in the middle.



Beam is directed against a Tritium target, which is rotated to redistribute the dissipated power over a larger area.



They also had a Russian accelerator based neutron source.



Very characteristic for Russian accelerators is that vacuum tubes are fixed with 4 screws only.

Anyway, this concludes our little tour at the irradiation facilities of the primary standard lab in bratislava, slovakia. Thanks to Hugo Palmans