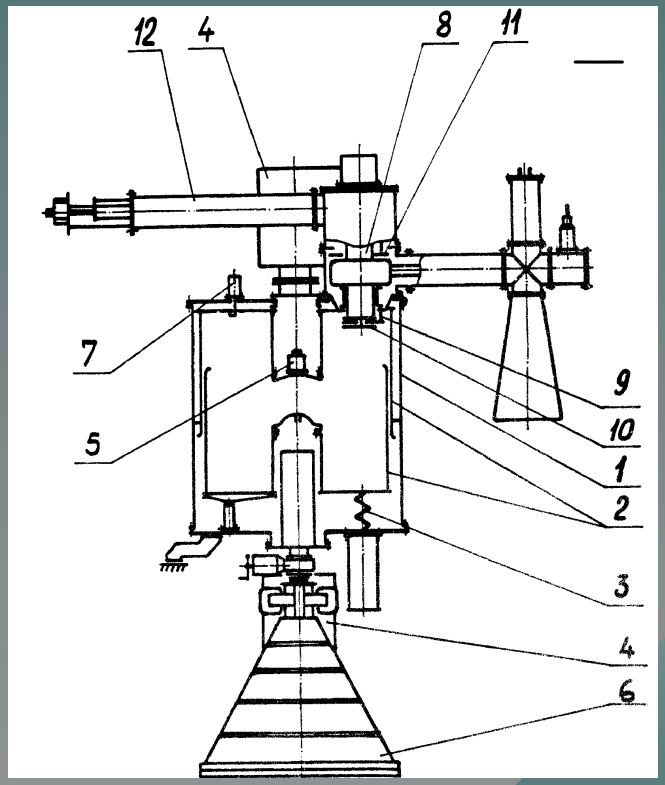
Status of the industrial RF-accelerators in BINP.

Budker Institute of Nuclear Physics
Novosibirsk

ILU accelerators produced by BINP.

PARAMETER	ILU-8	ILU-6	ILU-6M	ILU-10	ILU-10M
Energy range, MeV	0.5-1	1-2.5	1-2.5	3-5	2.5-4
Maximum beam power, kW	20	20	50	50	20
Average beam current, mA	25	20	25	15	8
Weight, tons					
Accelerator	0.6	2.2	2.2	2.9	2.5
Local shielding	76	-	-	-	-

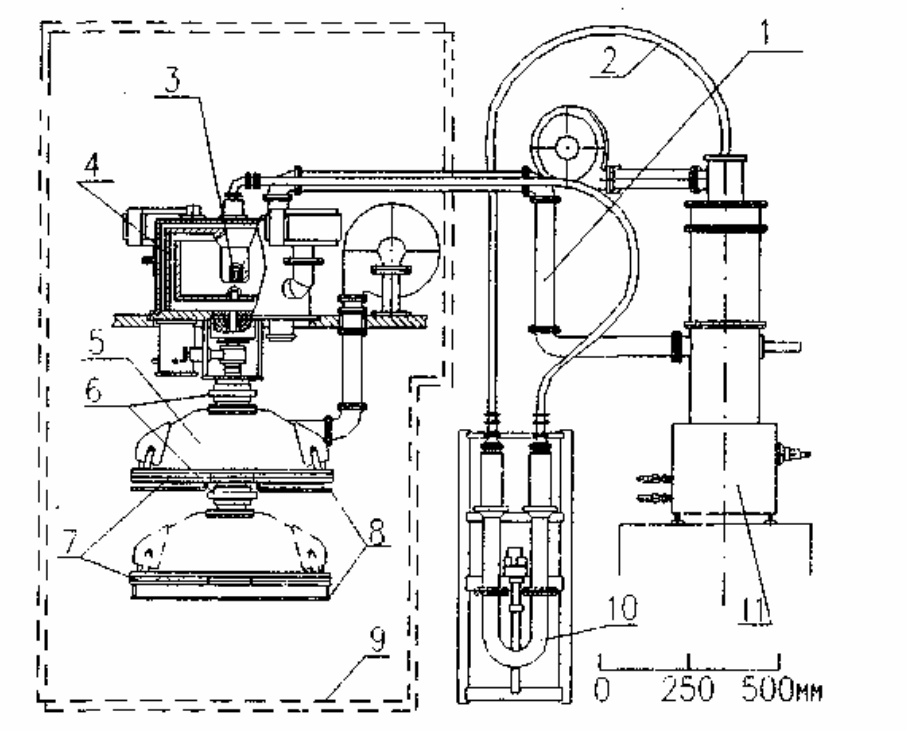
ACCELERATOR ILU-6

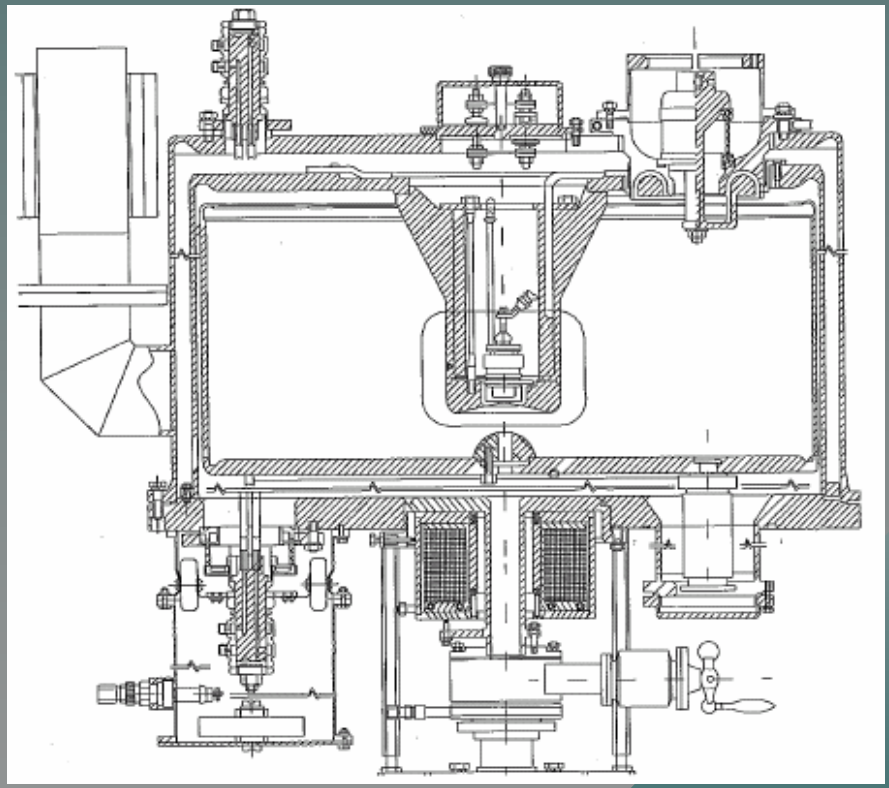


E=2.5 MeV P=20 kWt Frep.=50(60) Hz

Tpulse=500 μs

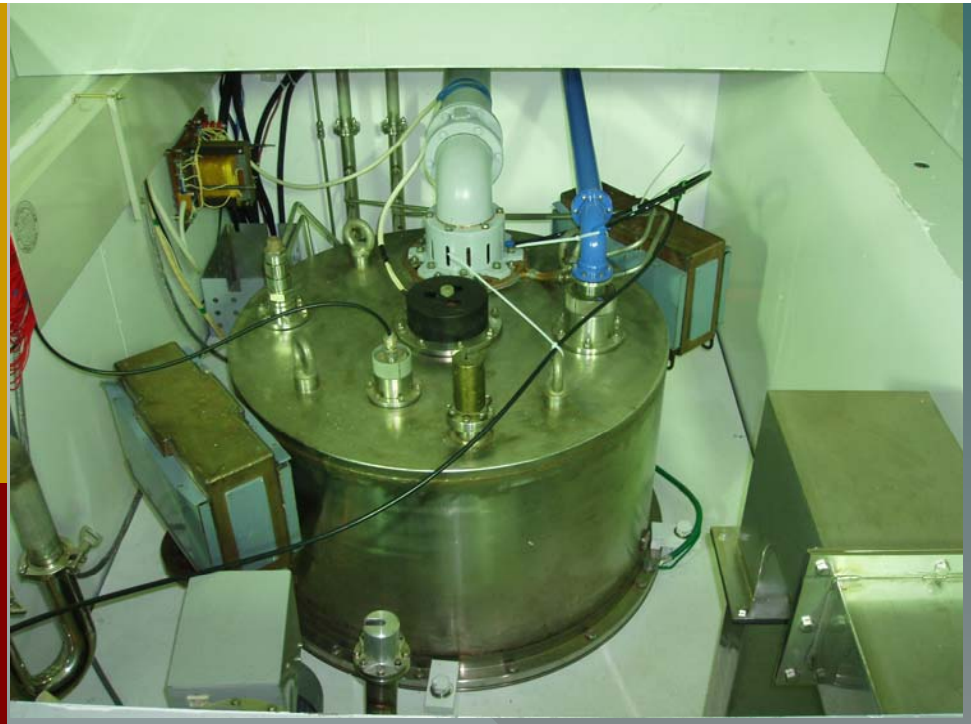
ILU-8





E=1 MeV P=20 kWt Frep.=50(60) Hz

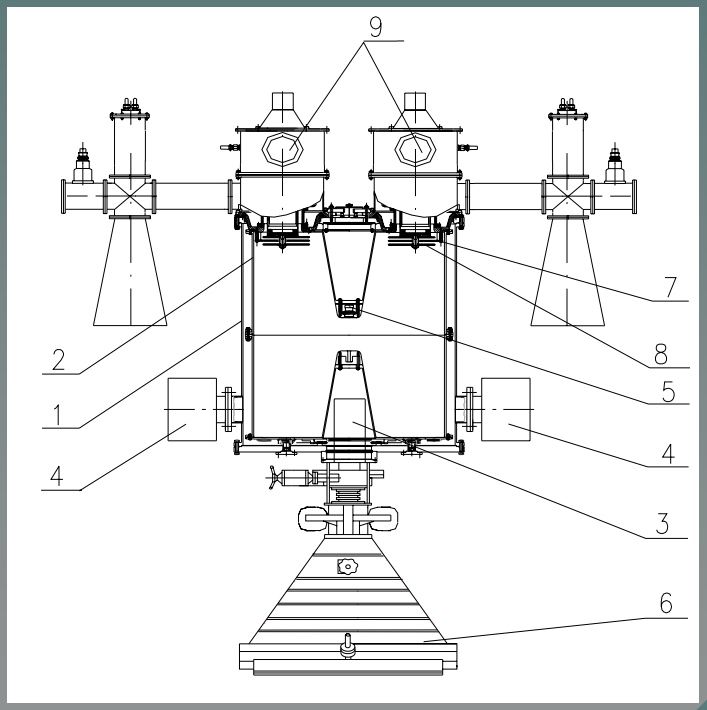
Tpulse=800 μs



Accelerator ILU-8
in local shielding.

Accelerator ILU-8 in local shielding, Korea.

ILU-10 accelerator

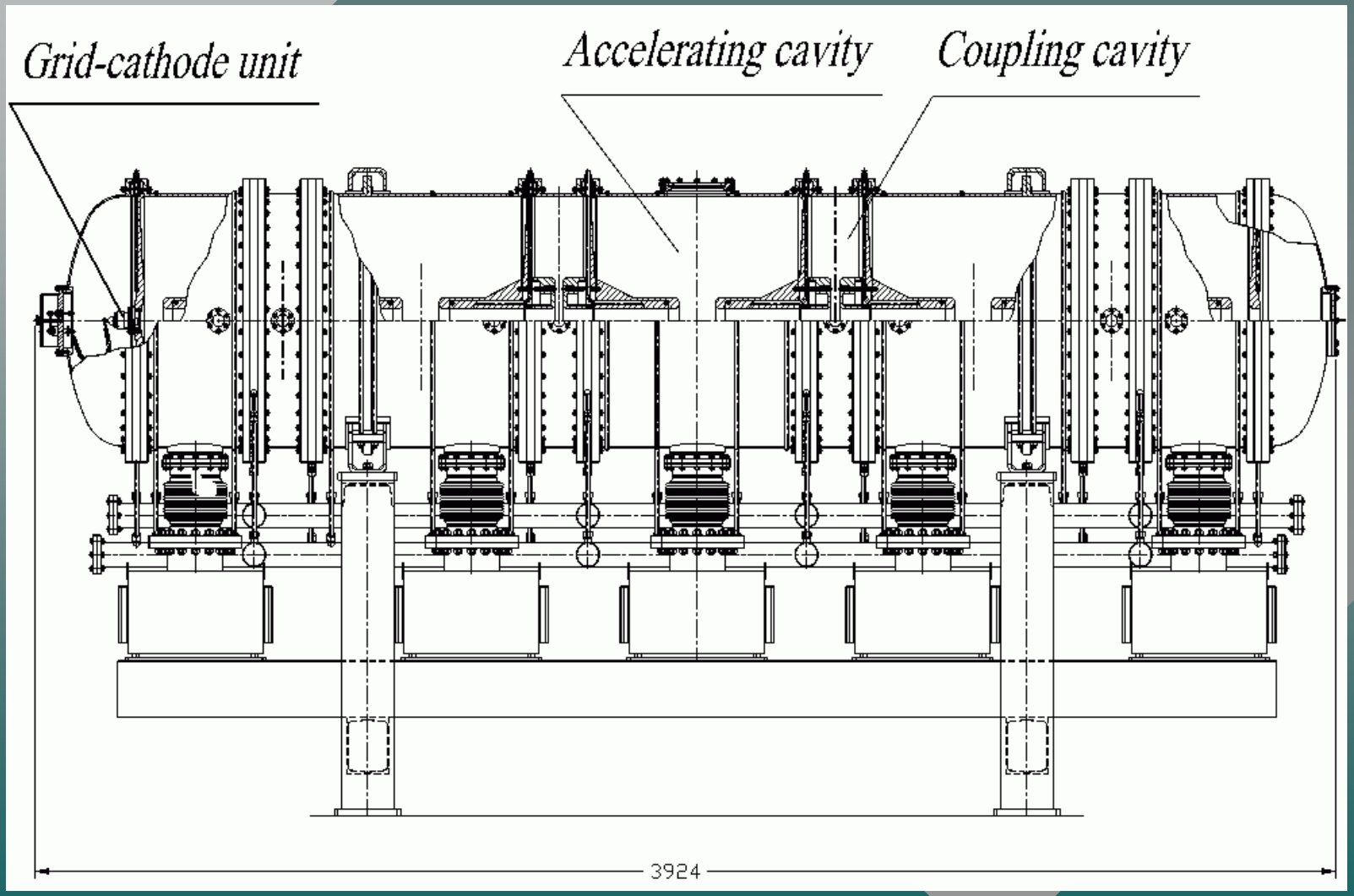


Energy 3-5 MeV

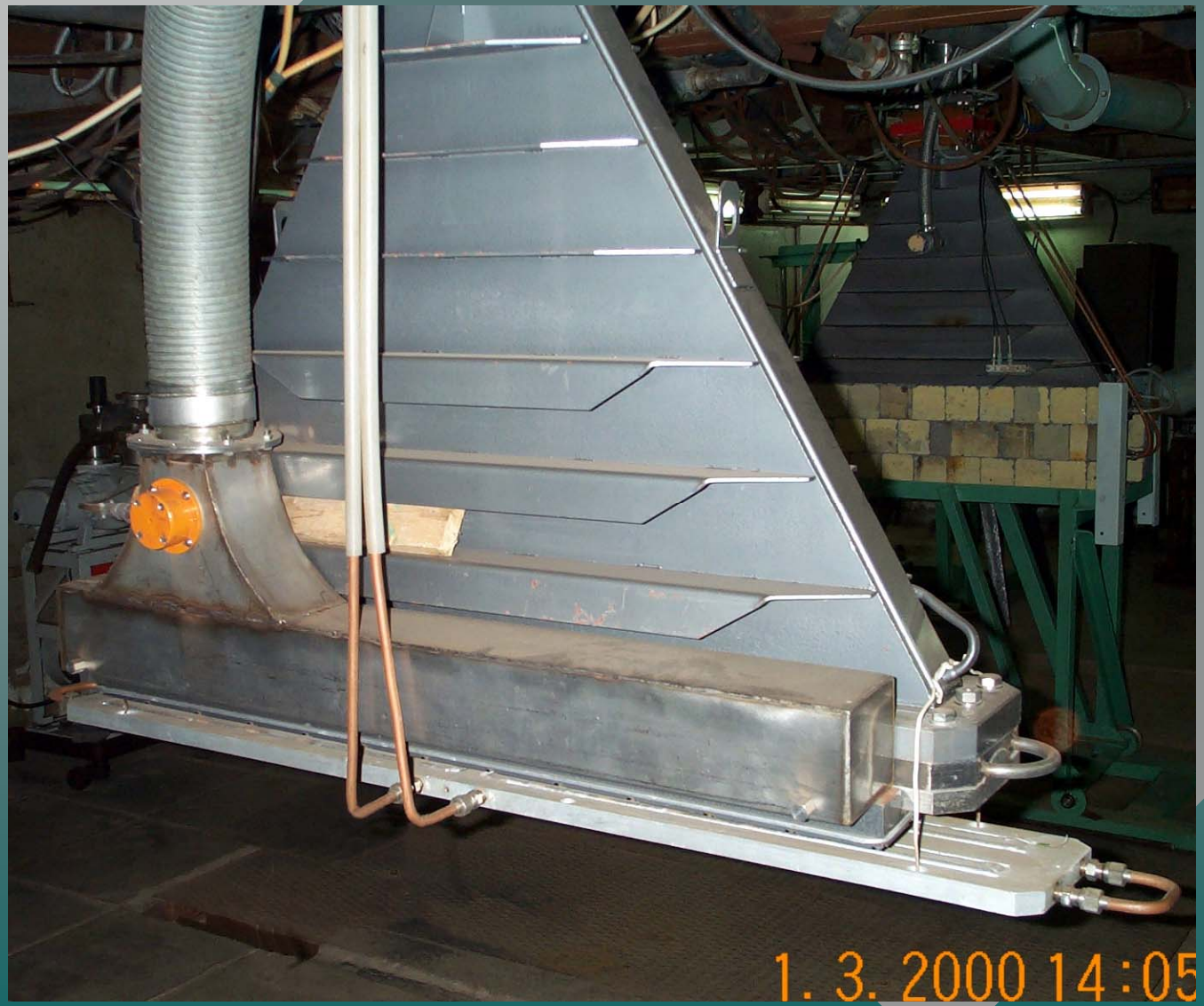
Power up to 50 kW

Tpulse=500 μs

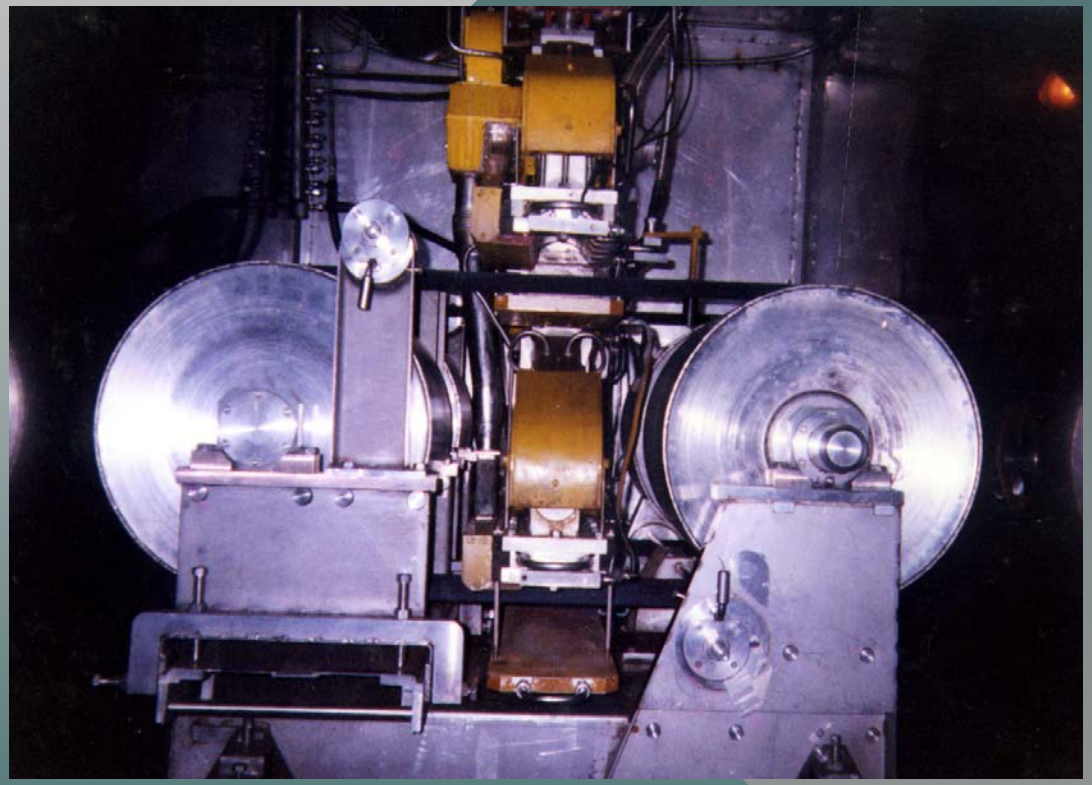
Project of ILU-12.
E=5 MeV P=300 kWt



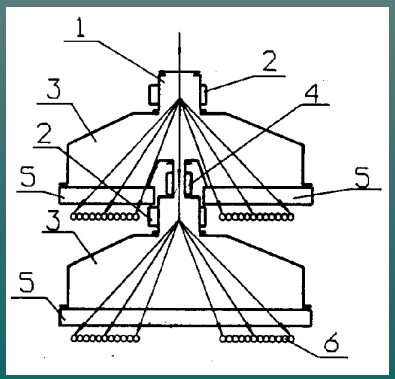
Extraction devices for ILU accelerators

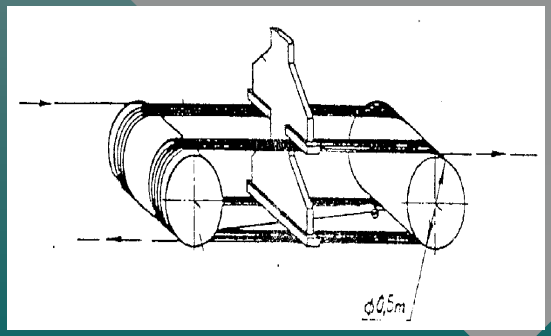


Extraction devices for 4-side irradiation



- Allow to increase efficient of the beam using up to few times compare 2 side irradiation
- No twist



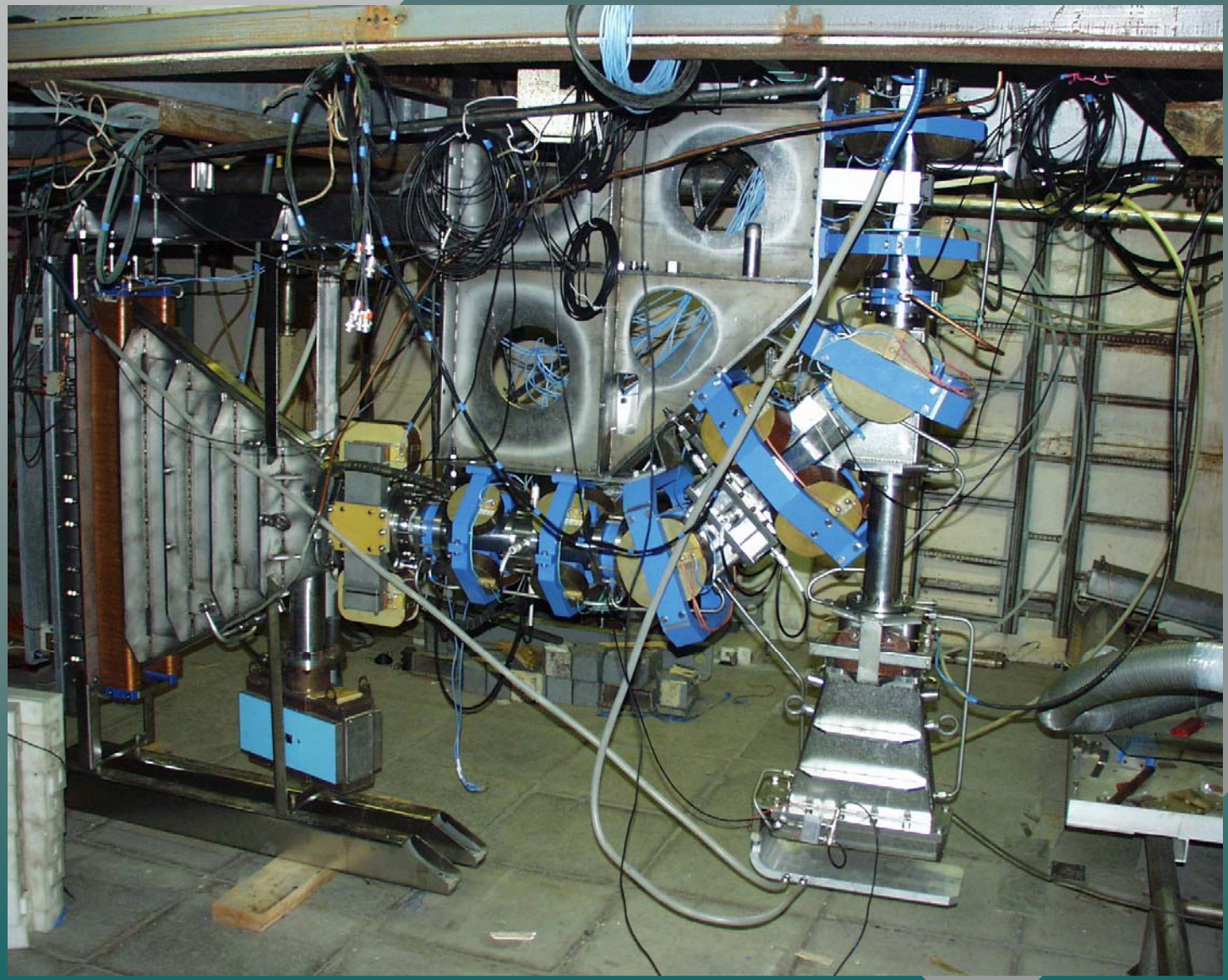


Installation for sterilization of single use syringes in packs. Russia 1996.

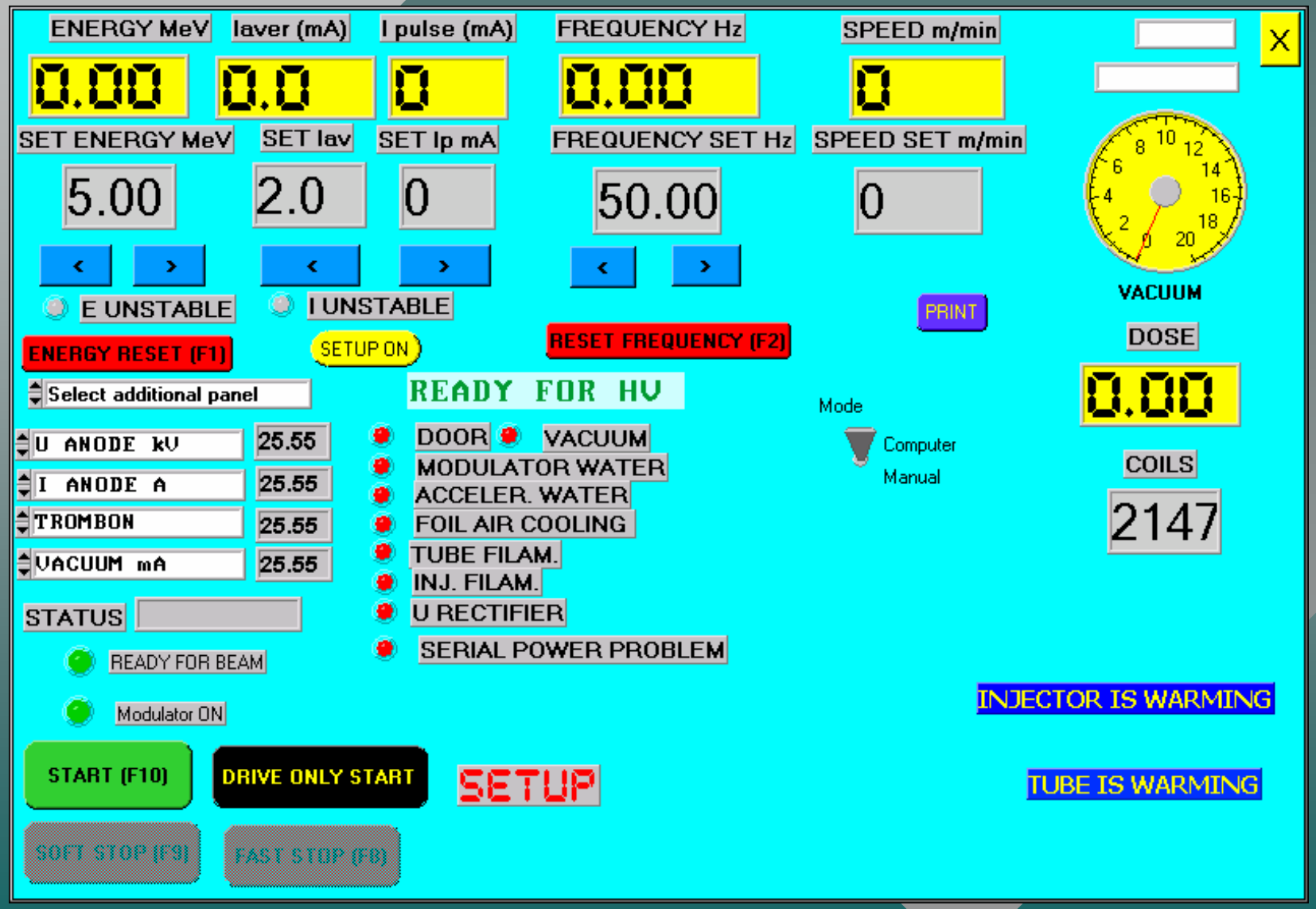
ILU-10 for X-ray applications

We have experience of making X-ray converter for beam of ILU-10. It applies for food pasteurizing. Converter consist of tantalum target and water cooling aluminum filter. We have achieved surface dose not less 15 kGy for velocity 1 mm/sec and width of scanning is 60 cm. Our X-ray beam allows irradiate of meat thick 30 cm by 2 side irradiation. The 3% of e-beam power are absorbed by the treated product as X-rays.

ILU-10 for X-ray applications



Main control panel of ILU



Advantages and disadvantages of ILU accelerators in compare HV accelerators.

Advantages.

Small dimensions for achieved parameters. Biological shielding more compact.

No need SF_6. SF_6 is included to list of green-house gases by Kyoto protocol.

Very simple accelerating structure.

Pulse nature of accelerator allows to easy design any multi-window beam extraction systems for increasing beam using efficiency and adapting irradiation process to customer equiptment.

Accelerator can start with full parameters without any time for setup.

More high efficiency of converting E-beam to X-ray for ILU-10.

Adjustable energy spectrum

Disadvantages

Low efficiency from plug to beam.

Power of 1-gap ILU accelerators is limited by power of produced generators tube.

Conclusion

ILU accelerators are most advantageous for next cases:

- For irradiate of thick product with energy 2.5-5 MeV
- X-ray irradiation
- Workshops where place limit.
- Cases with undesirable SF_6