

Microwave Radio Electronics

Coaxial and Sonde Microwave Testing

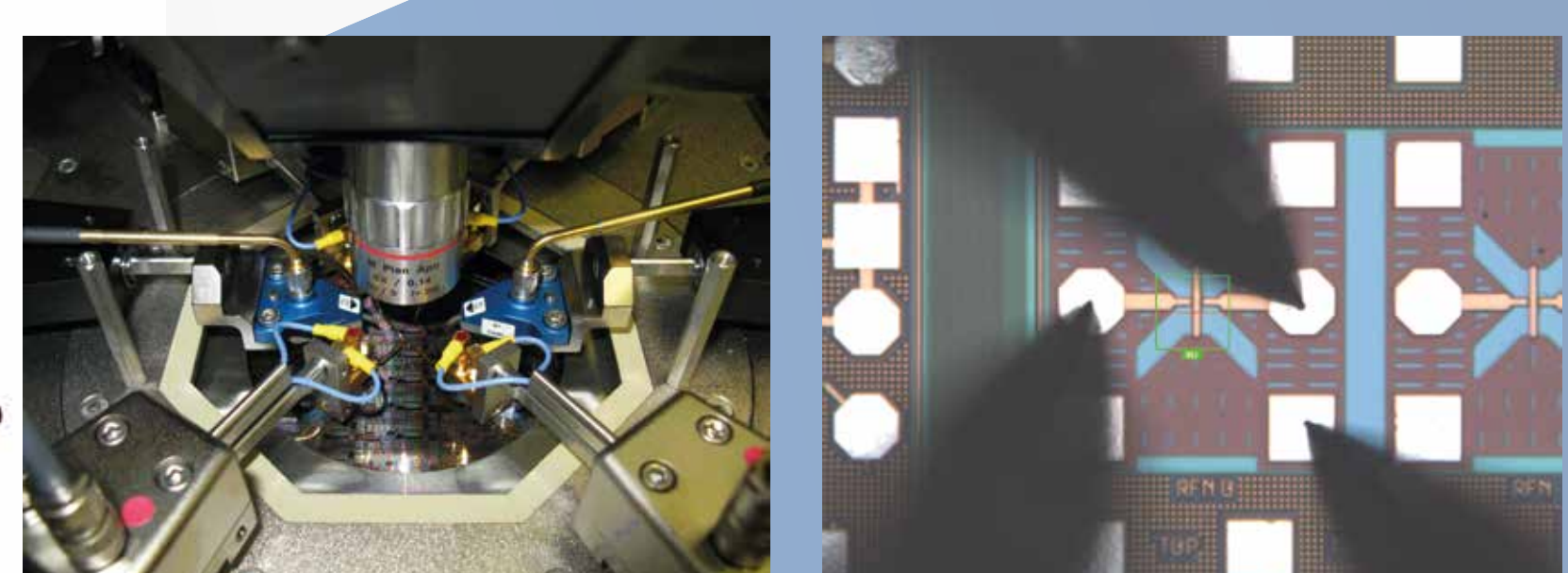


Complex Extraction Parameters

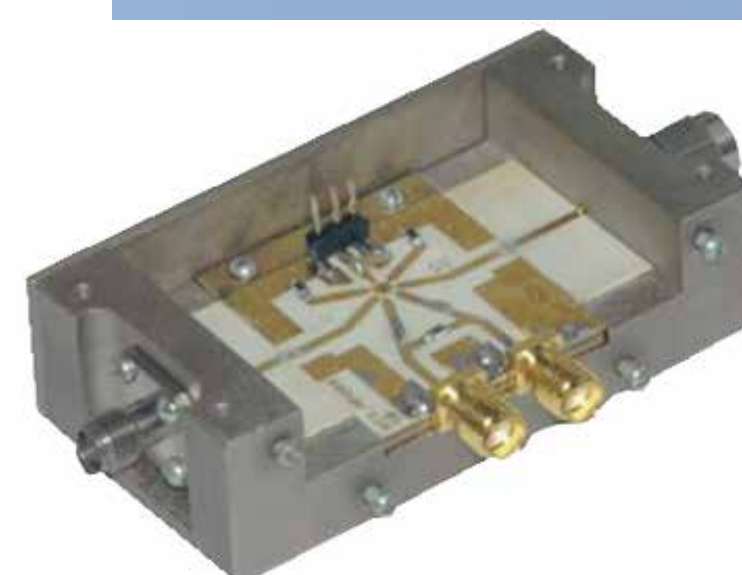
Semiconductor parameter analyzer Agilent B1500A

14-channel blok matrix switches Agilent B2201A

Automated hardware-model parameter extraction library items for semiconductor industries based on a specialized CAD software Agilent IC-CAP and semiconductor parameter analyzer Agilent B1500A.



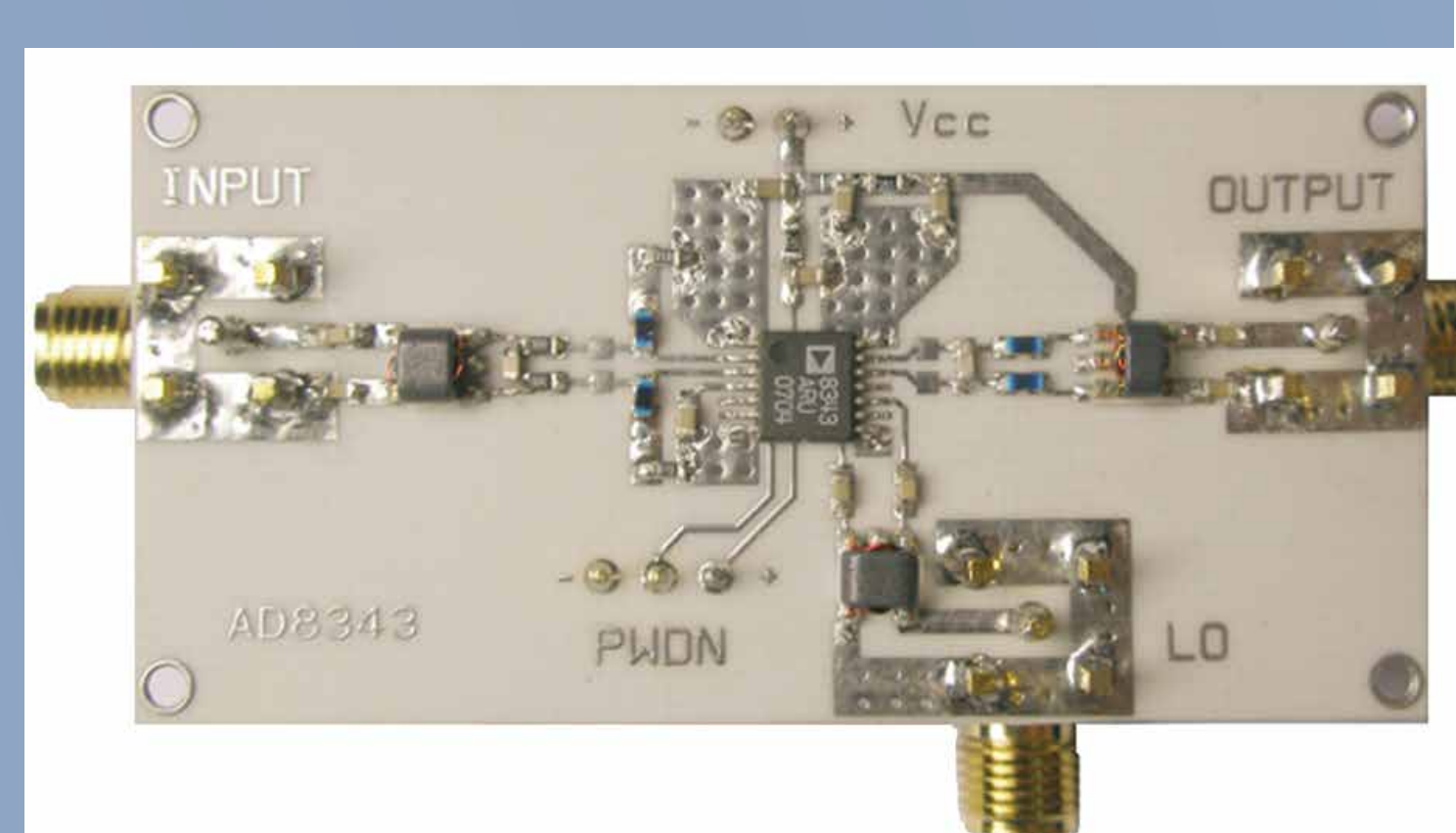
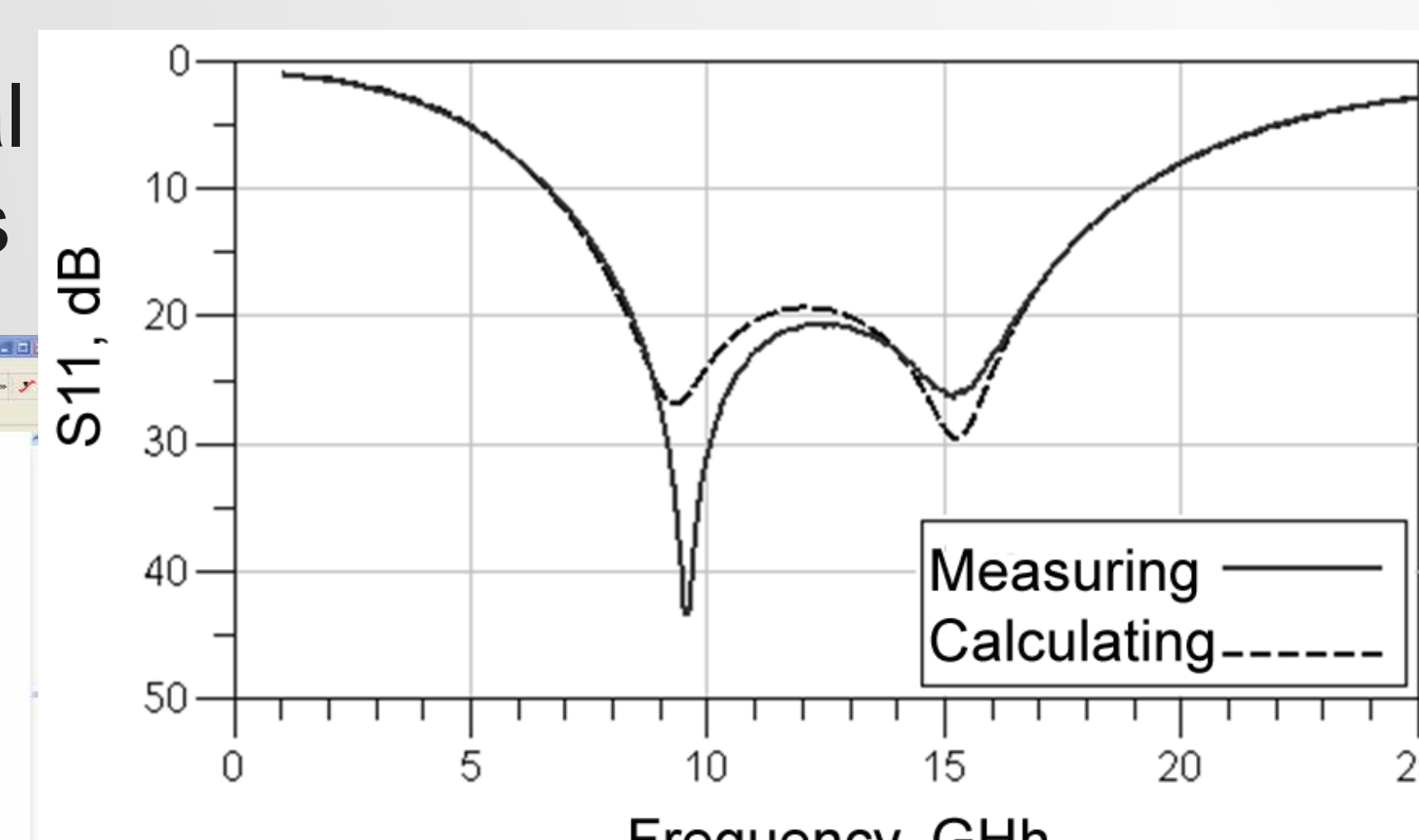
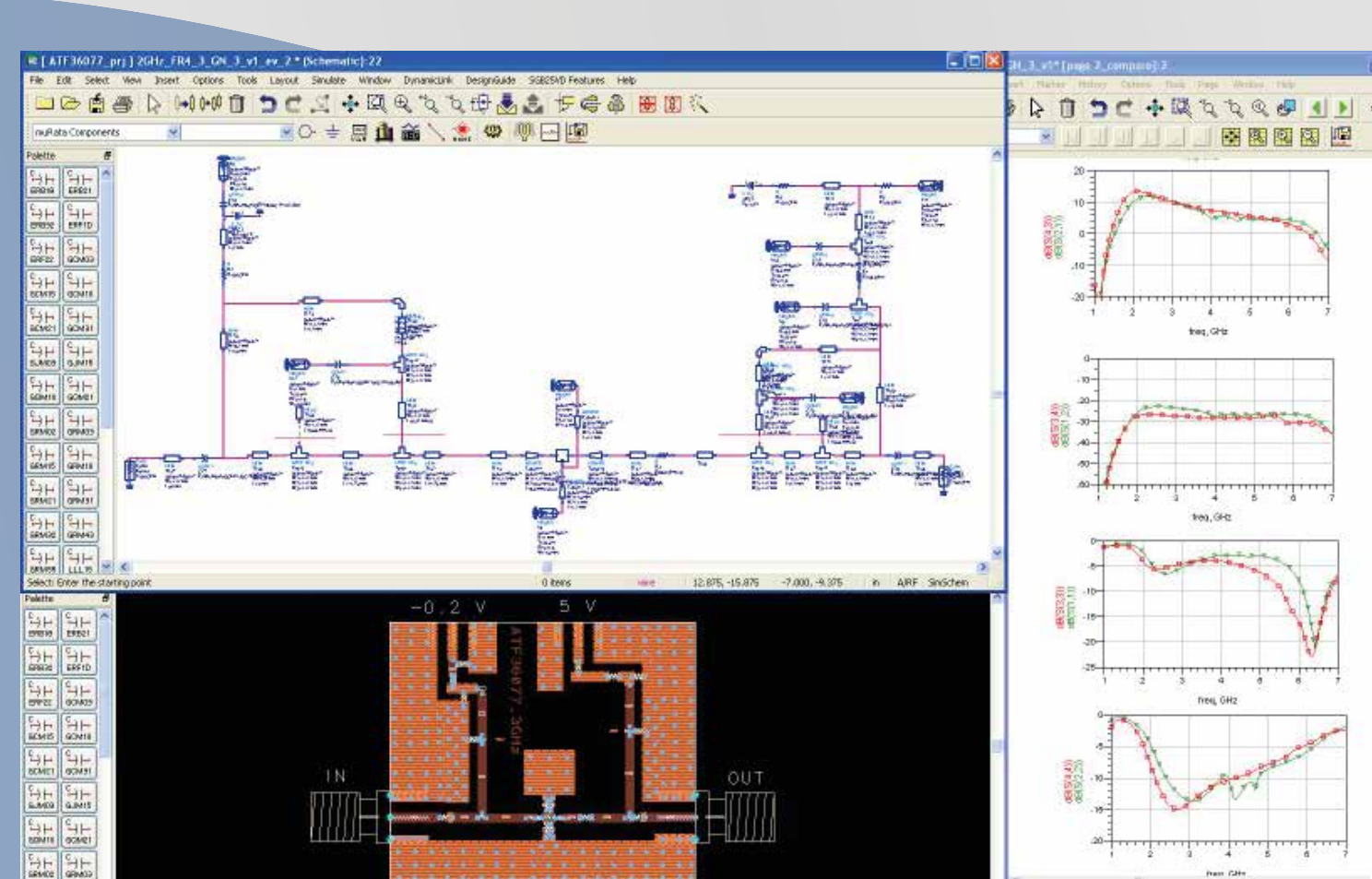
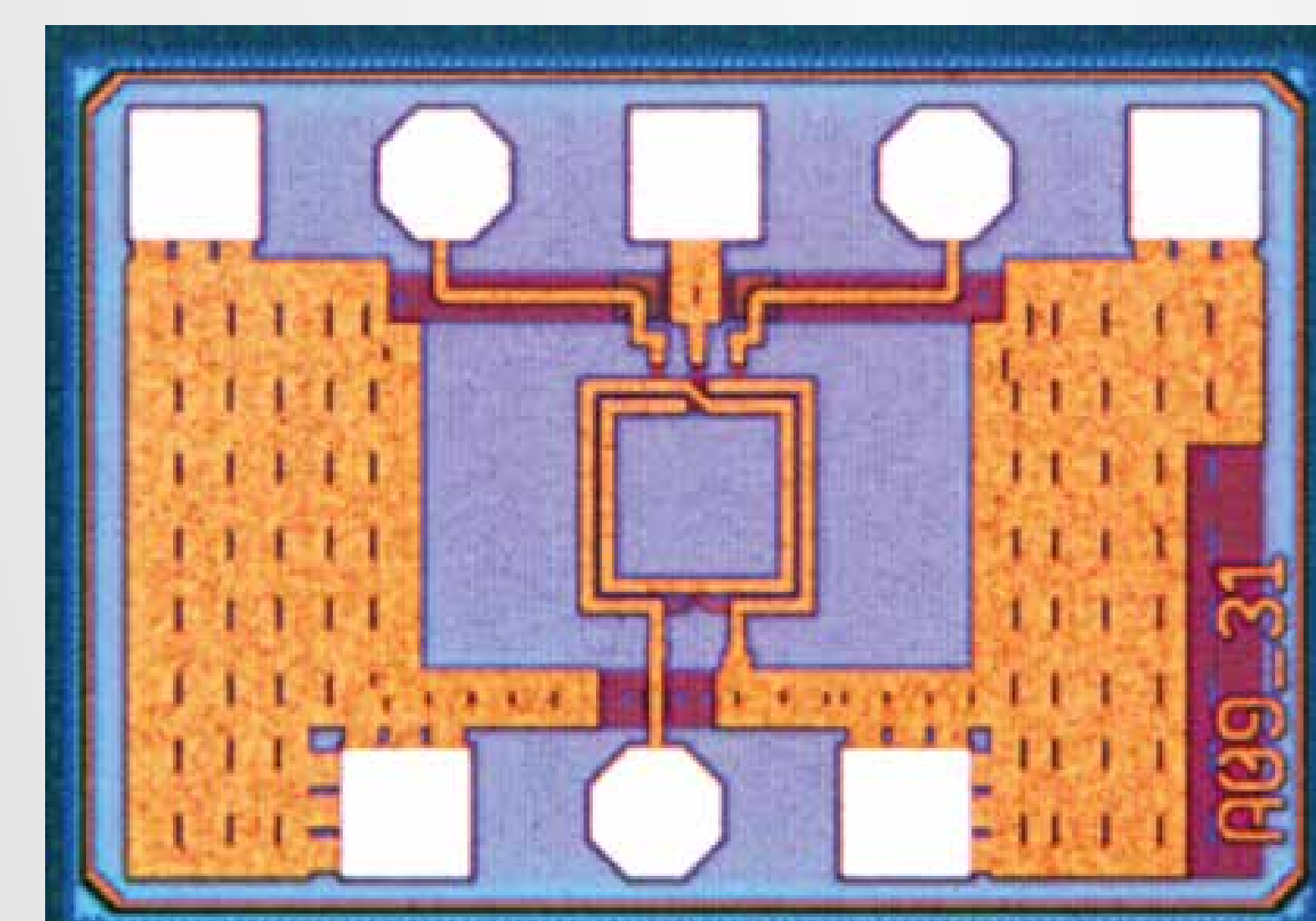
Sonde testing in the range up to 50GHz



Coaxial testing in the range up to 20GHz

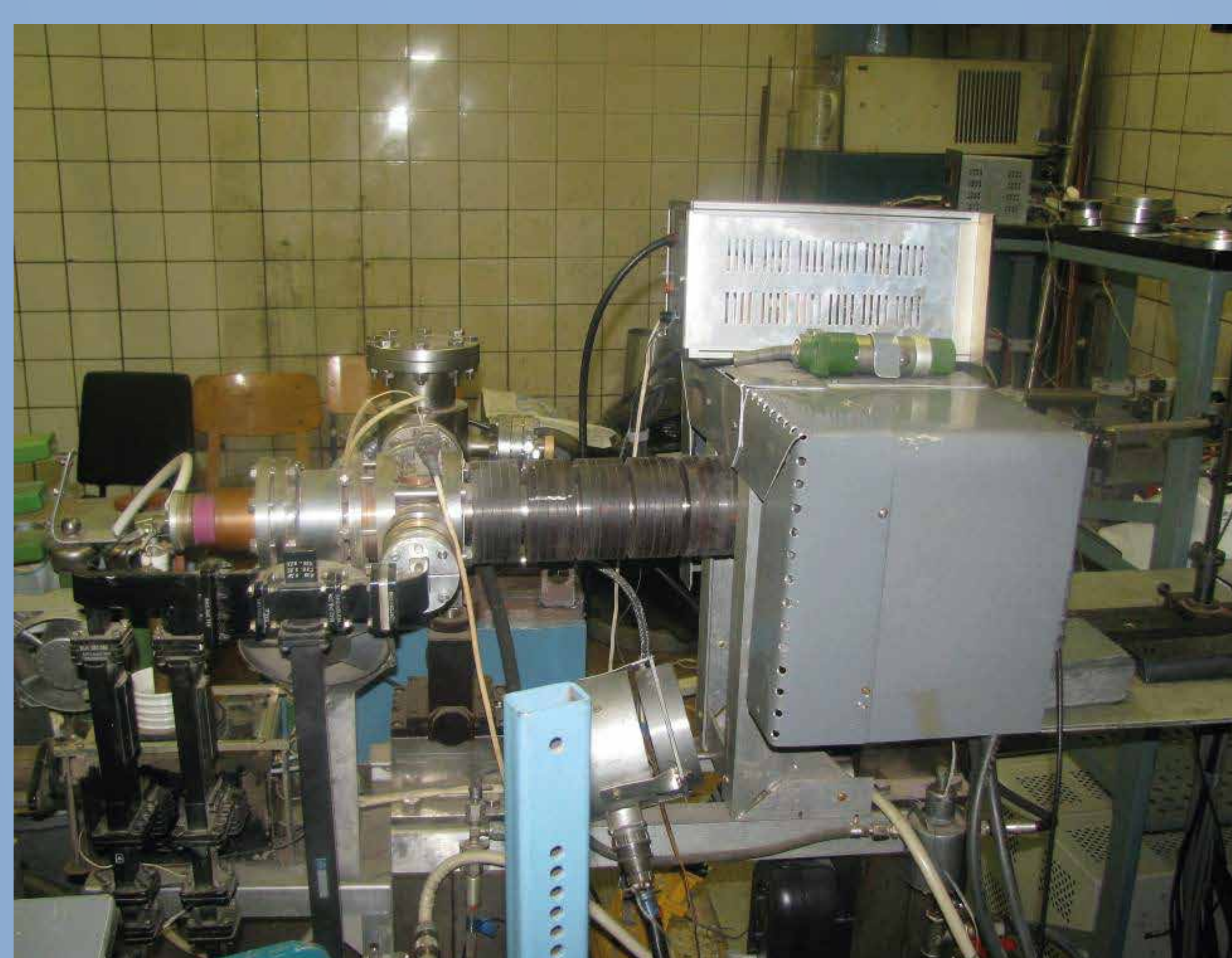
Design and Modeling

- Design of monolithic circuits (chips) for microwave transceiver channels in the range up to 24 GHz
- Design of hybrid integrated circuits, including testing rigs to study microwave ICs in the range up to 20 GHz.
- Electromagnetic simulation of cermet and glass-to-metal cases for microwave circuits



Irradiation Test Facilities

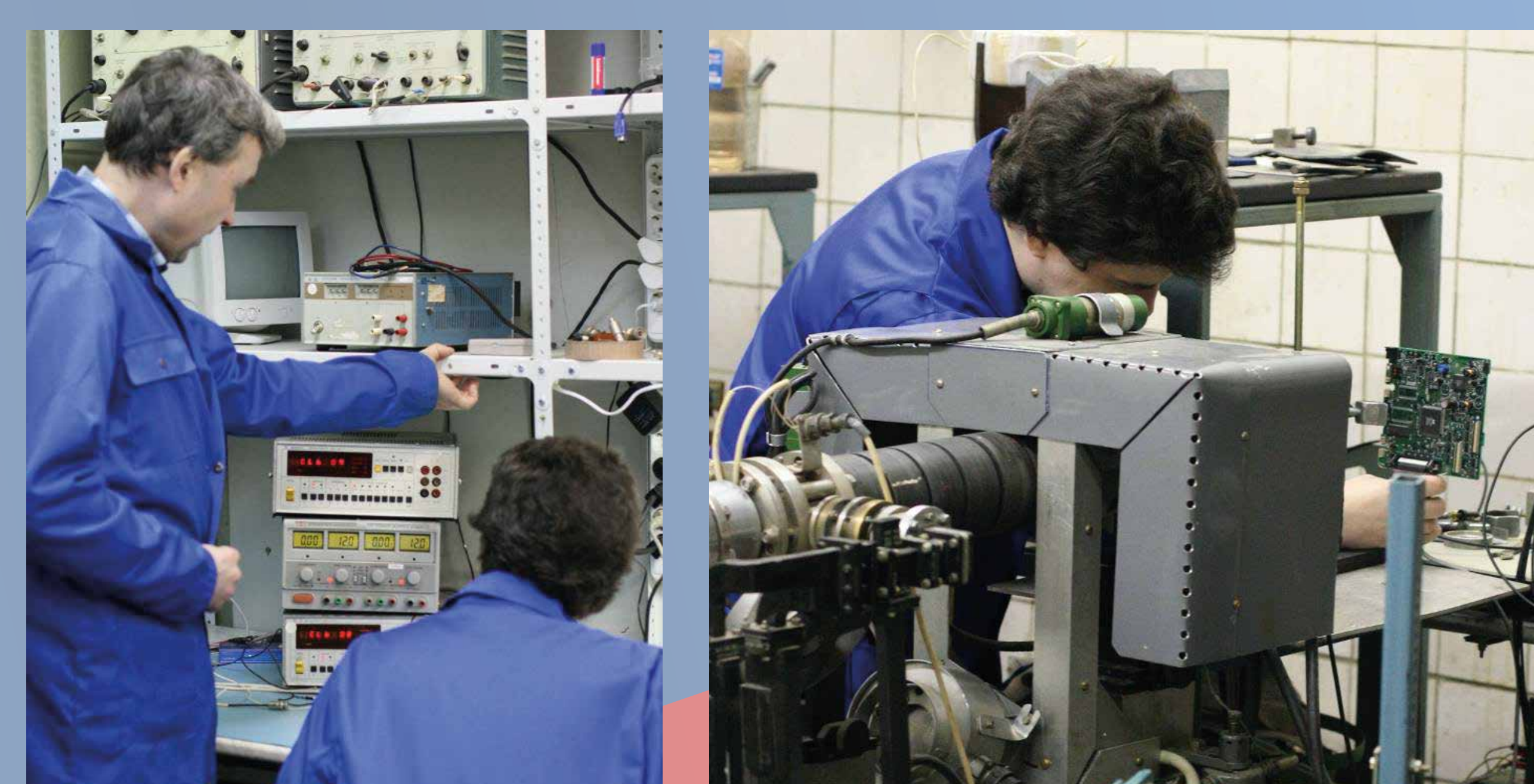
Electron Facility LINAC U-31/33



LINAC U-31/33 in X-ray mode is primary used for TID effects investigations (special target).

Energies	2 MeV
Min - Max fluxes	1...15 μ A
Spot size	4 mm (output window)
Spot homogeneity	20 %
Test chamber (vacuum, air)	air
Device positioning system	manual

Chanel length	7 m
Available lines and interfaces	128 shielded signal lines 8 power lines 20 RG-50 lines RS-232, Centronics, USB NI PXI-1033 cable
Measurement	Based on NI PXI platform (PXI-6723, PXI-4110, PXI-6229, PXI-4071 etc.)



Source type	X-ray
Emitted radiation / energy	Maximum energy of X-ray - 2 MeV Average energy of X-ray - 450 keV
Dose rates	1...50 R/s
Volume of irradiation chamber	200 x 200 x 1000 mm

Electron Facility LINAC RELUS-1



LINAC RELUS-1 in X-ray mode is primary used for TID effects investigations (special target).

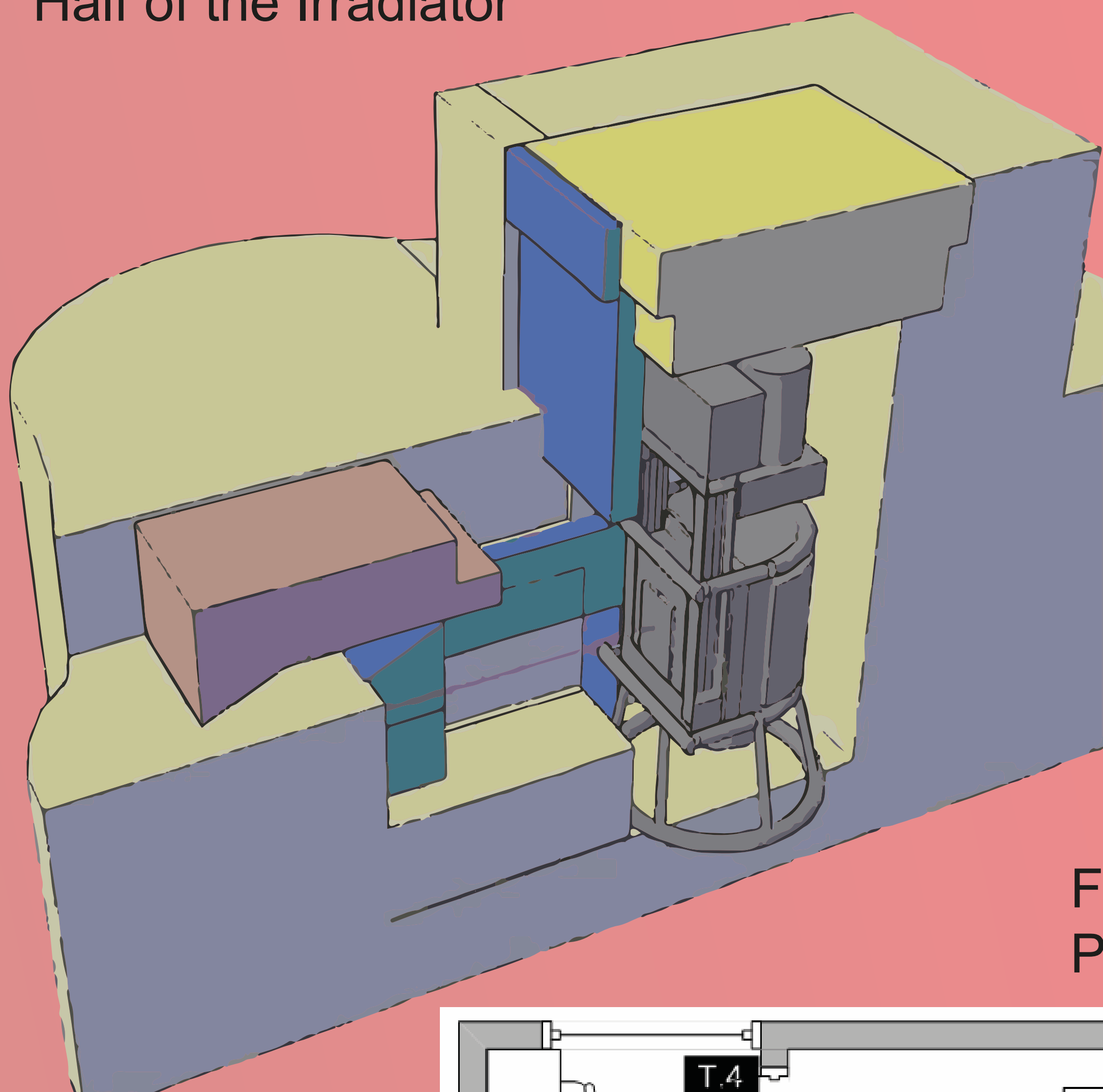
Source type	X-ray
Emitted radiation / energy	Maximum energy of X-ray - 3.5 MeV Average energy of X-ray - 650 keV
Dose rates	1...200 R/s
Volume of irradiation chamber	200 x 200 x 1000 mm

Energies	3.5 MeV
Min - Max fluxes	1...50 μ A
Spot size	4 mm (output window)
Spot homogeneity	20 %
Test chamber (vacuum, air)	air
Device positioning system	manual



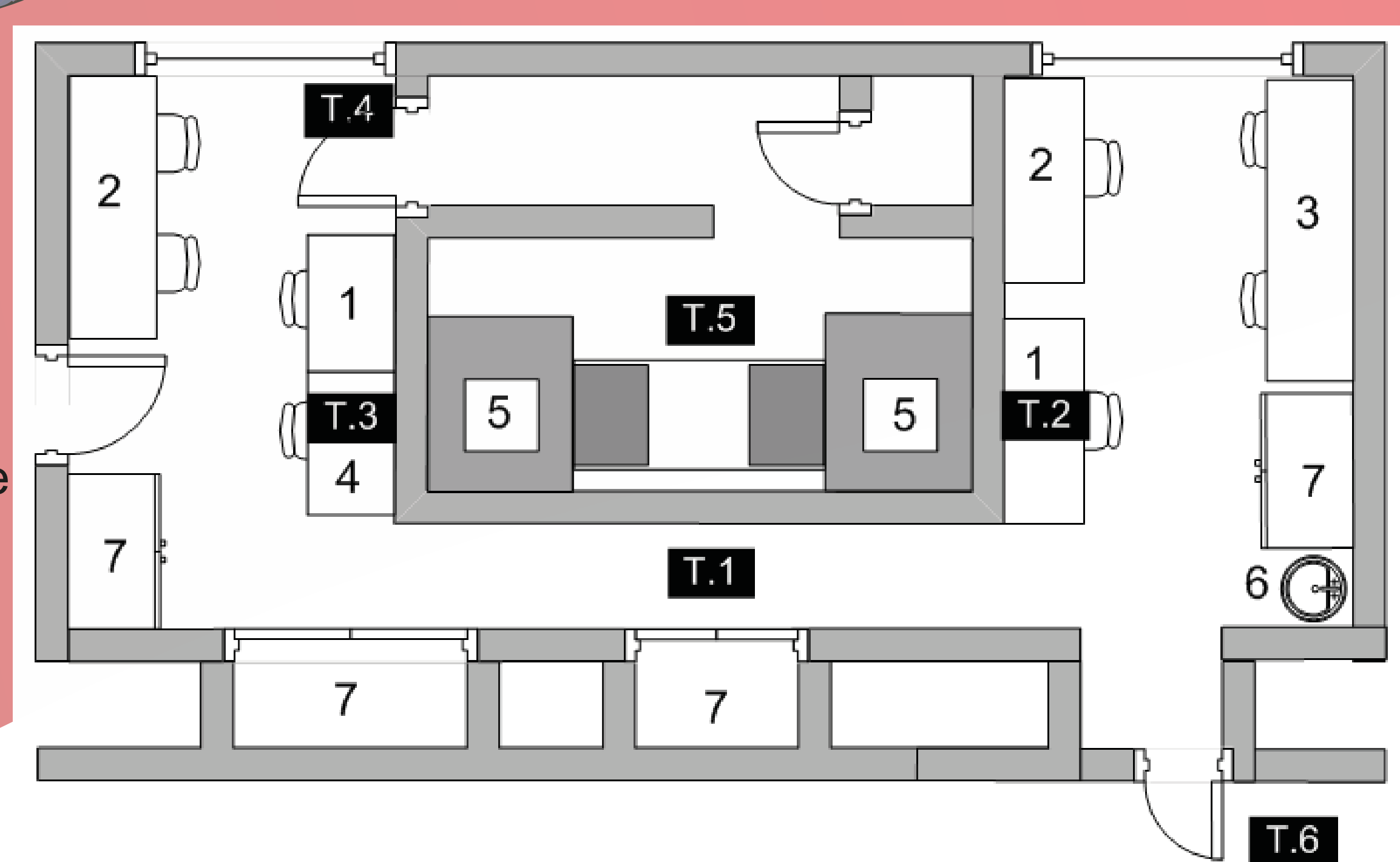
Gamma Irradiator Panorama Mephi

Cross Section of One Half of the Irradiator



Gamma Irradiator Panorama Mephi consists of two facilities:
- ^{60}Co
- ^{137}Cs

Floor Plan of the Panorama Mephi

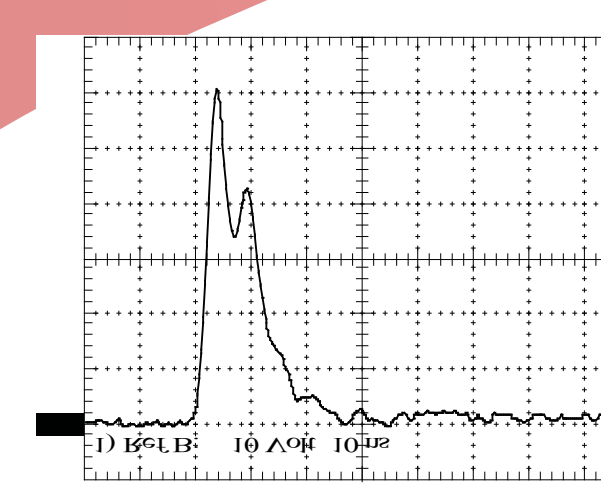


- Operating position
- Gaging equipment
- Thermal printing
- Control station
- Radioactive source
- Sink
- Cupboard

Pulsed Electron Accelerator ARSA



Energies	0.2...1 MeV
Min - Max fluxes	$1.2 \cdot 10^{14}$ R/s, pulse 10 ns
Spot size	10 mm (output window)
Spot homogeneity	30 %
Test chamber (vacuum, air)	air
Device positioning system	manual



ARSA pulse waveform

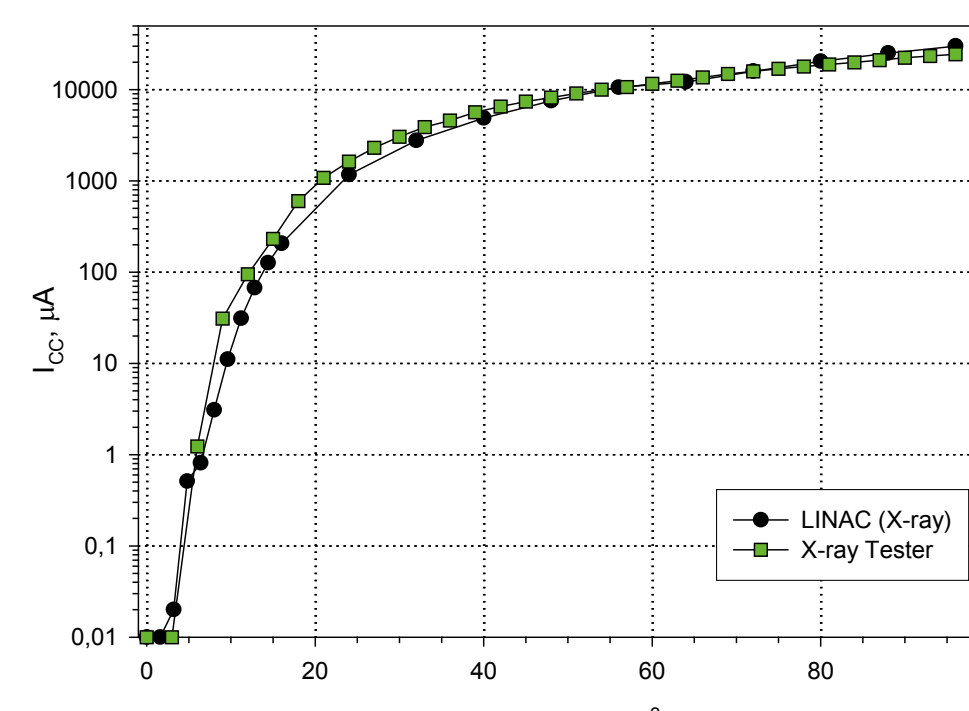
Source type	X-ray
Emitted radiation / energy	Maximum energy of X-ray - 1 MeV Average energy of X-ray - 140 keV
Dose rates	$1 \cdot 10^{10}$ R/s, pulse 10 ns
Volume of irradiation chamber	400 x 400 x 500 mm

X-Ray Testers (Imitators) RIK-0401 and RIK-0402



X-ray Testers RIK-0401 and RIK-0402 are designed and manufactured by SPELS. They are used by many enterprises and test centers for TID effects investigations in plastic packed/decapsulated ICs and semiconductor devices.

Source type	X-ray
Emitted radiation / energy	Maximum energy of X-ray - 50 keV Average energy of X-ray - 10 keV
Dose rates	1...200 R/s
Volume of irradiation chamber	200 x 200 x 200 mm



Source type	X-ray
Emitted radiation / energy	Maximum energy of X-ray - 100 keV Average energy of X-ray - 10...20 keV
Dose rates	1...250 R/s
Volume of irradiation chamber	200 x 200 x 200 mm