Development of radiation detectors

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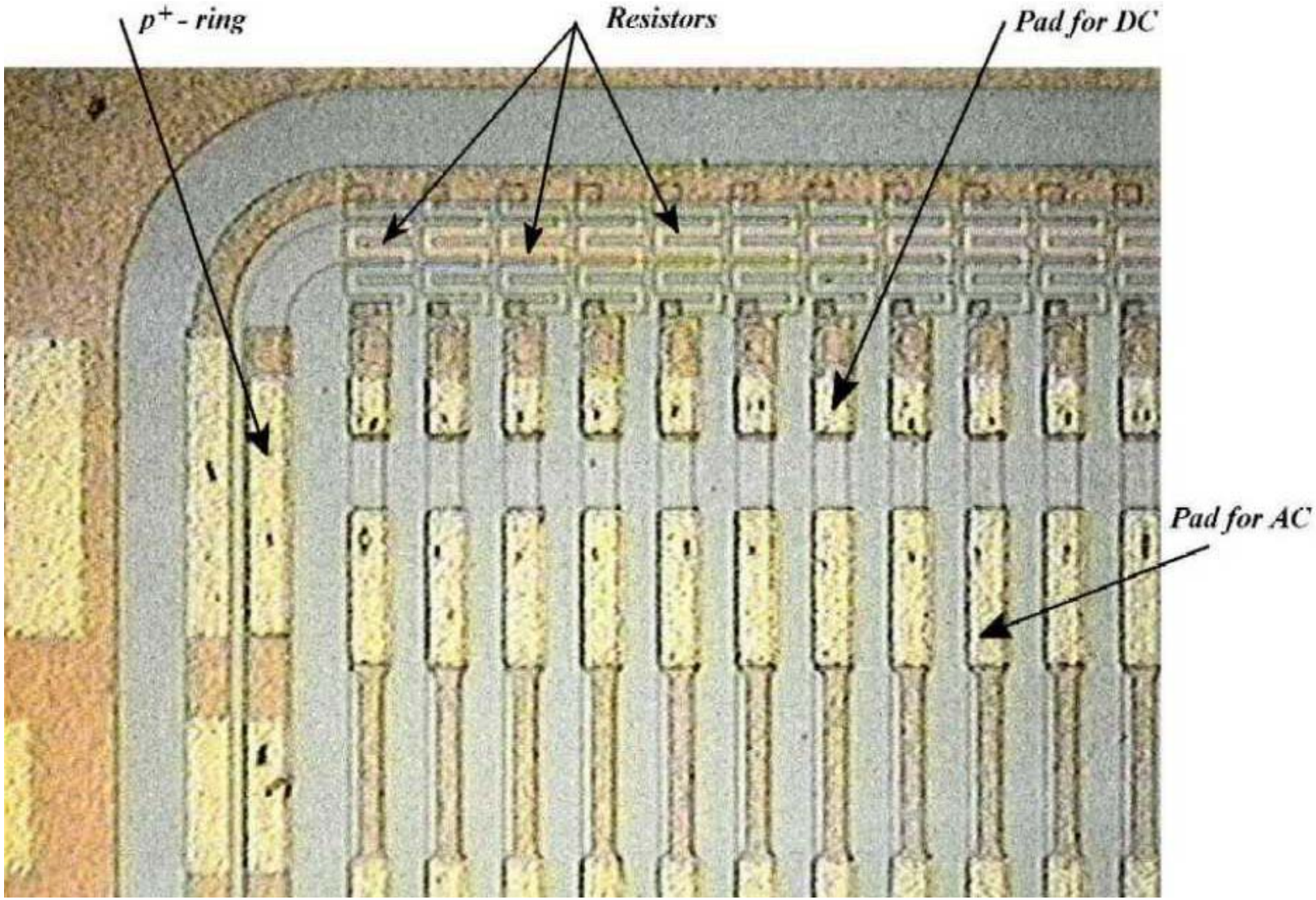
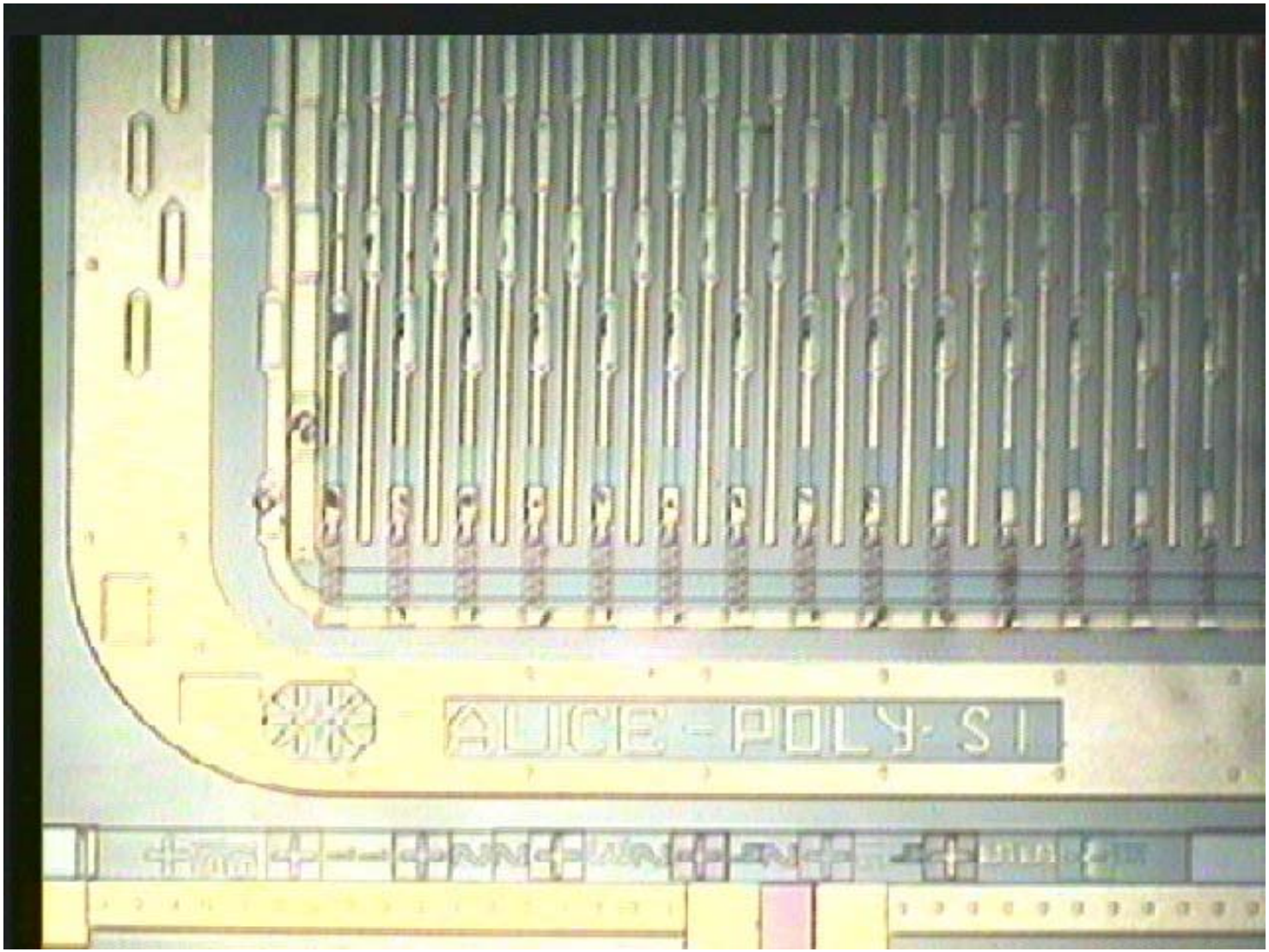
SINGLE SIDED SILICON MICROSTRIP DETECTOR

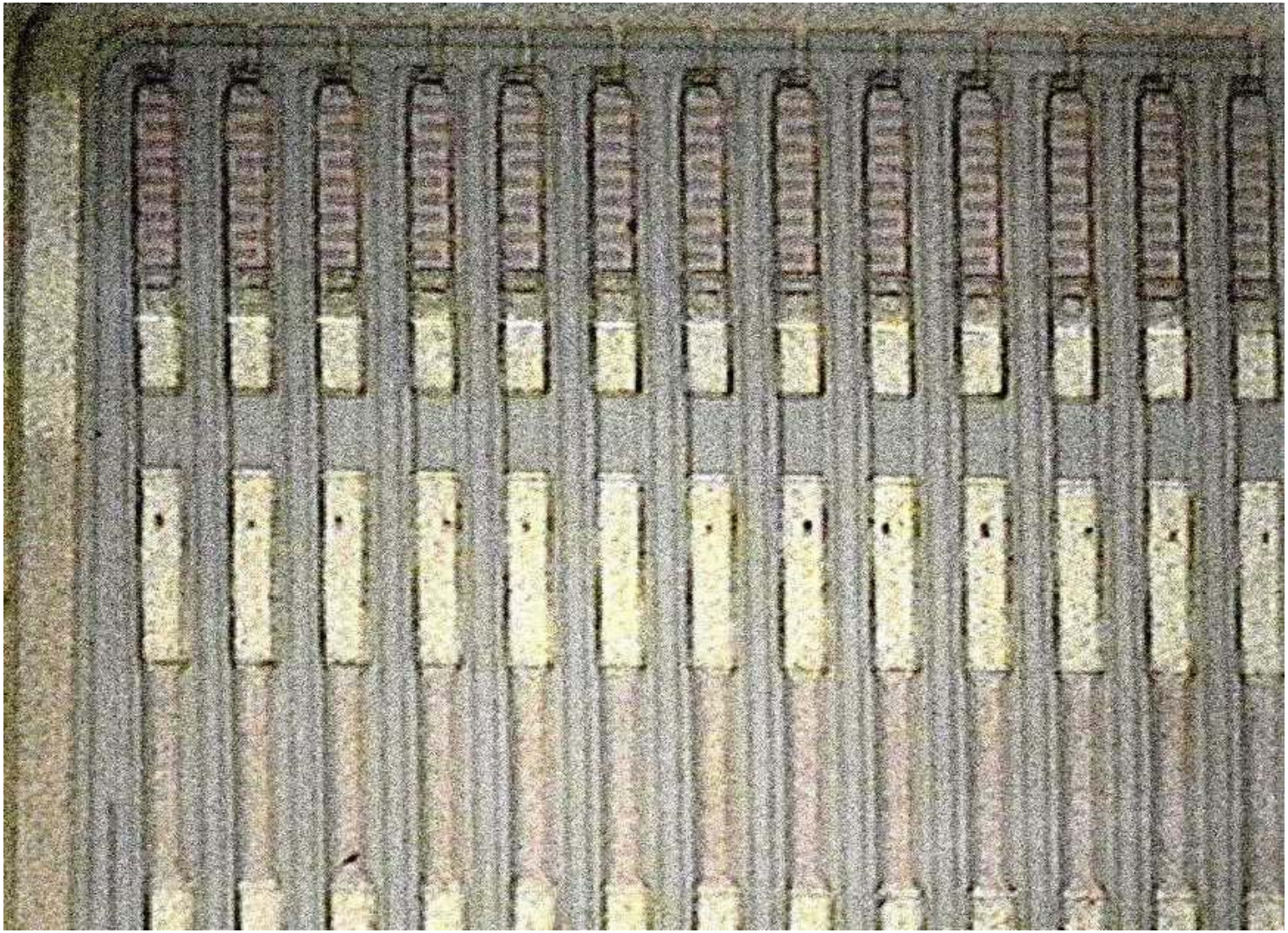


DOUBLE SIDED SILICON MICROSTRIP DETECTOR



DOUBLE SIDED SILICON MICROSTRIP DETECTOR

Ohmic side



Electrical Specifications

DETECTOR # 2

- Operating voltage *V*o: 50 V
- Leakage current of the guard ring: 50 nA
- Leakage current of the bias ring (Ib.r.): 0,9 μA
- Leakage current of each strip: ≤ 0,5 nA

(Leakage currents are defined at operating voltage *V*o(*V*o ≥ *V*i + 5 V(*V*i- insulation voltage)), in the darkness and at a temperature of 20°C).

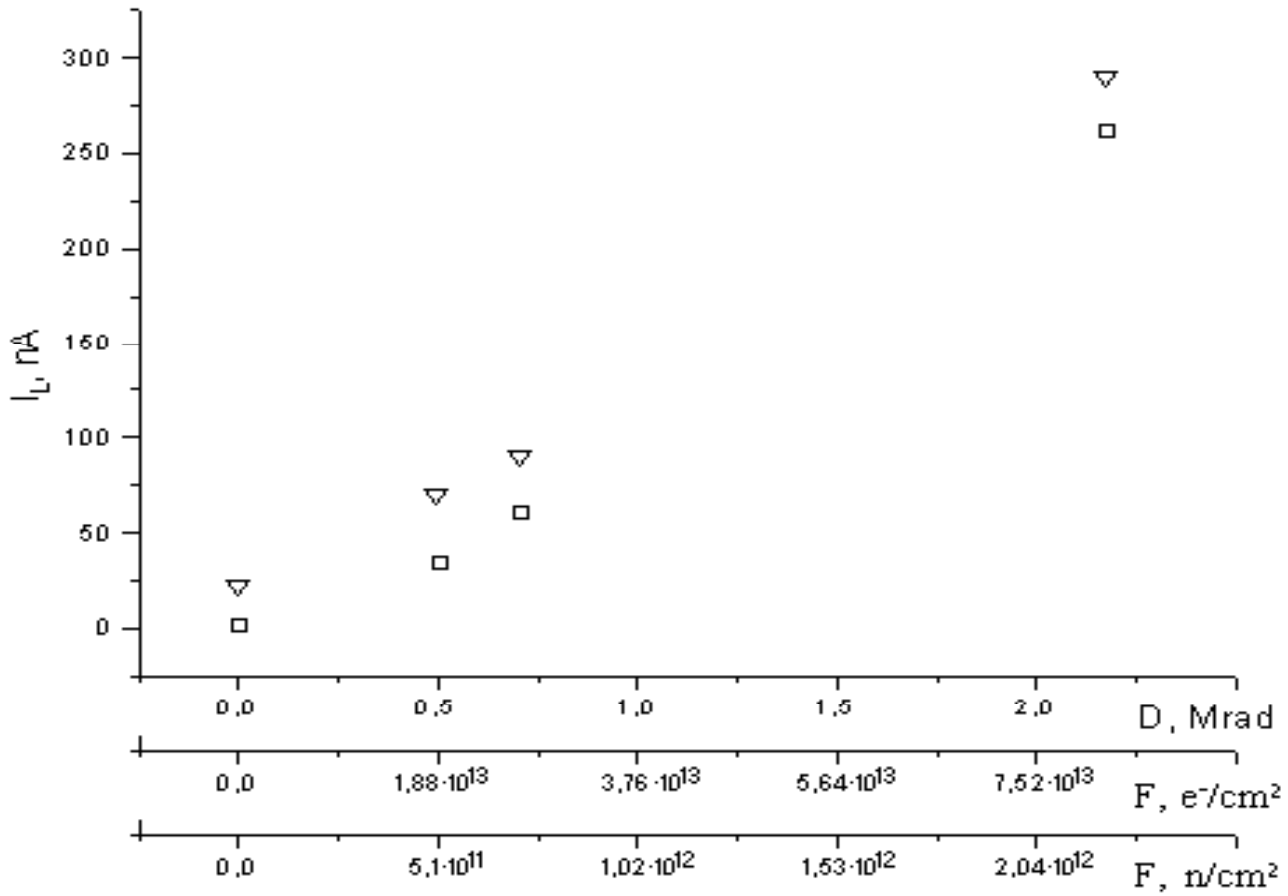
- Detector breakdown voltage *V*bd (Ib.r. > 2 Ib.r.(50V)): *V*bd > 100 V

Polysilicon resistors: p+-side - 11 MΩ
n+-side - 11 MΩ

- Insulation resistance between adjacent DC strips at *V*o: p+-side - ≥ 50 GΩ
n+-side - ≥ 10 GΩ
- Interstrip capacitance *C*is (50 V, 1 MHz): p+-side - ≤8 pF
n+-side - ≤10 pF
- The coupling capacitance *C*c.c. of the strips: p+-side - 160 pF
n+-side - 200 pF

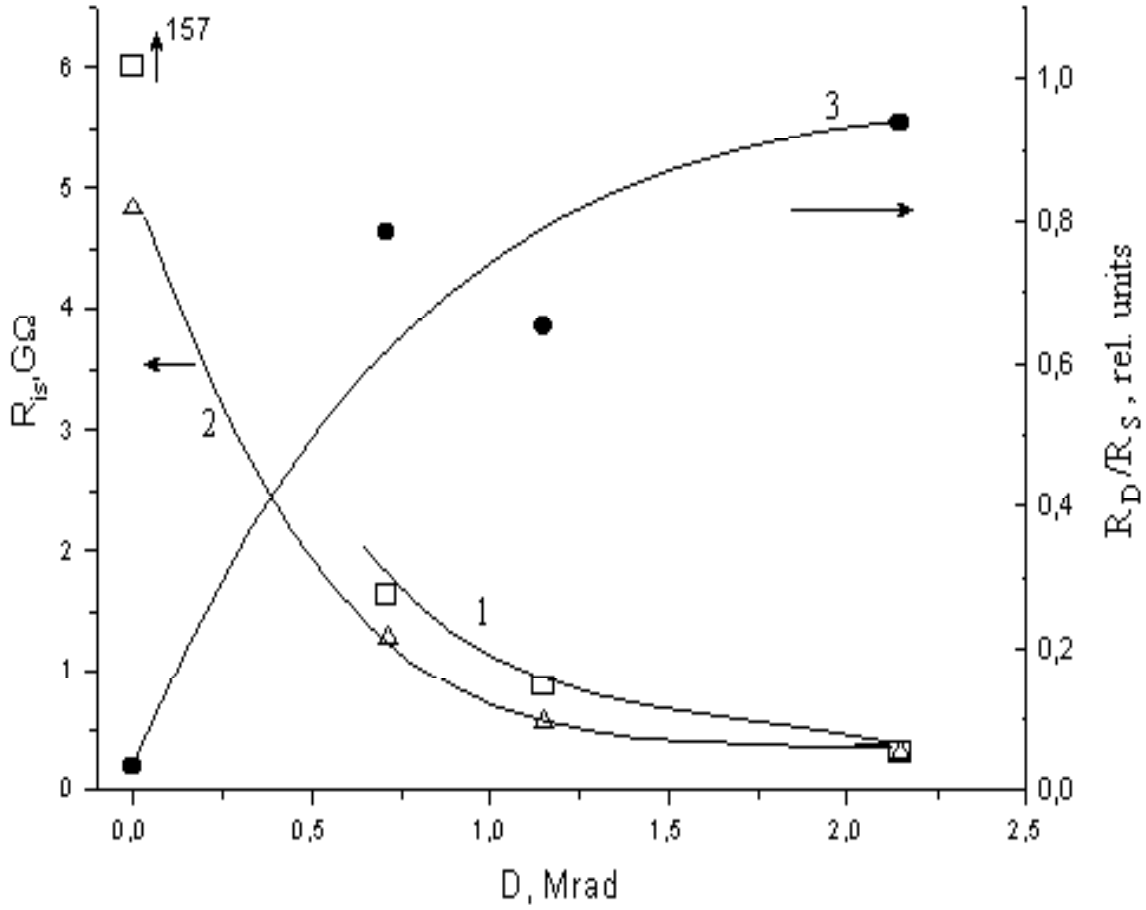
- Breakdown voltage of coupling capacitors: p+-side - > 100 V
n+-side - > 100 V
- Leakage current through individual coupling capacitors (measured with 20 V applied across the AC capacitor dielectric, e.g. between aluminium strip and bulk): < 0,5 nA
- Resistance of a metal strip (AC strip) end-to-end: < 50 Ω

IRRADIATION OF SILICON MICROSTRIP DETECTORS . KHARKOV



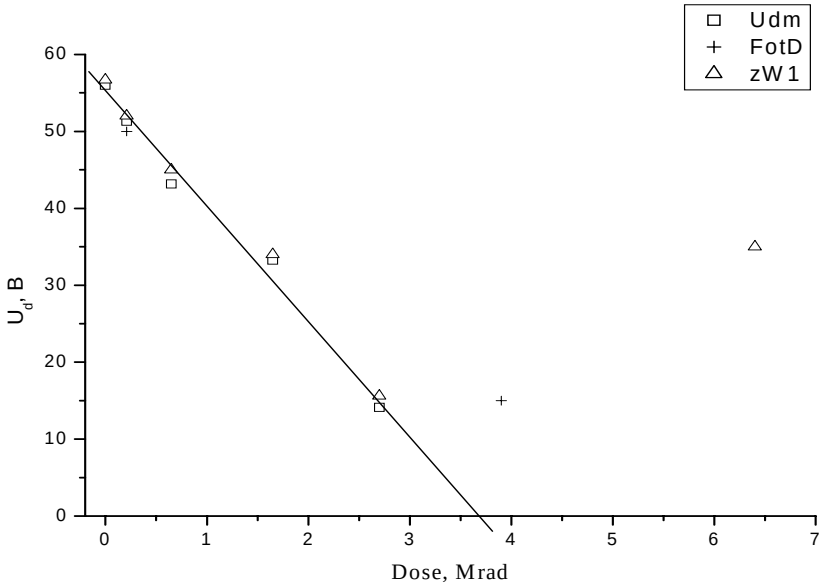
Leakage currents variation for microstrip detectors with (▽) and without Si3N4 (□)

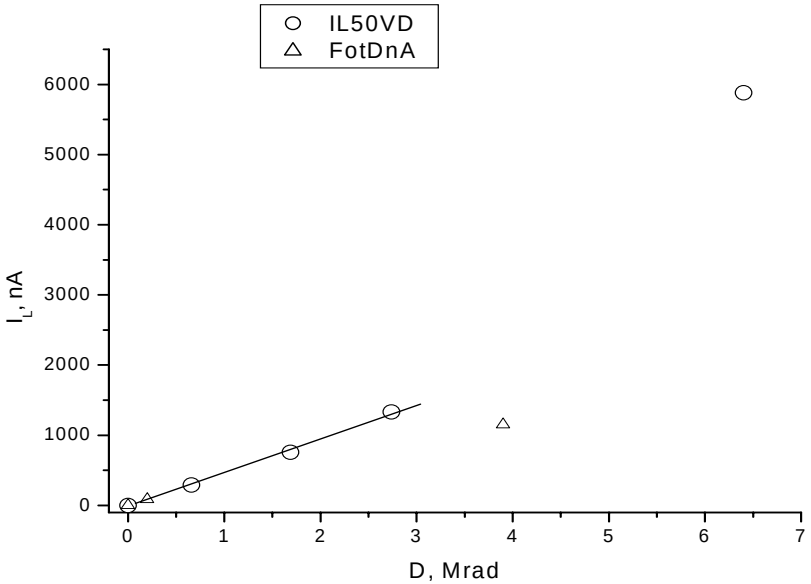
IRRADIATION OF SILICON MICROSTRIP DETECTORS . KHARKOV



Interstrip resistance for the detectors without (1) and with (2) Si3N4. Interstrip resistances ratio for the detectors with double-layer and single-layer insulation (3).

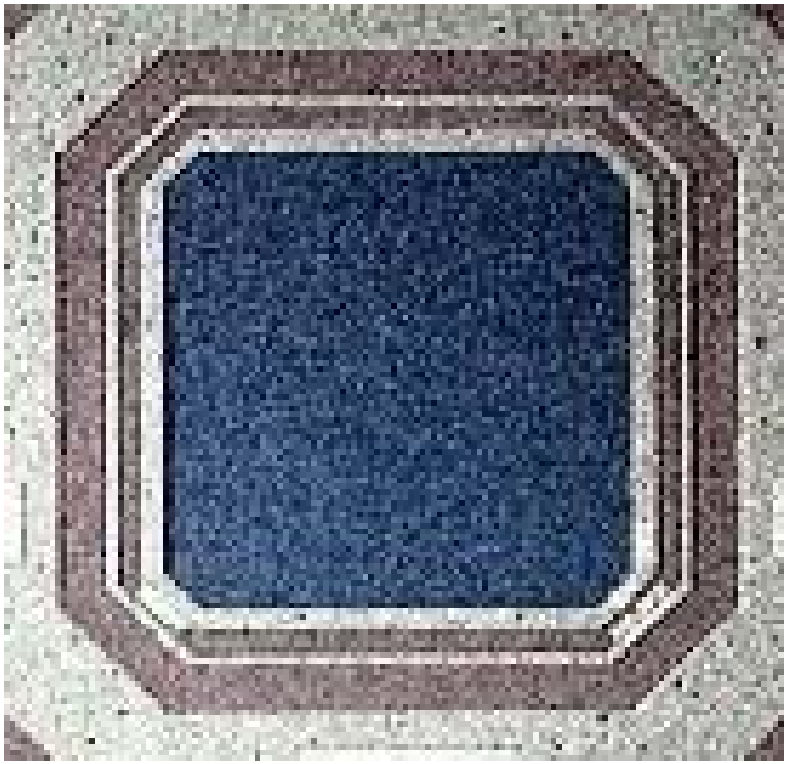
IRRADIATION OF SILICON MICROSTRIP DETECTORS . KHARKOV





- *Full depletion voltage for different irradiation dose. O, □, Δ, +– are here the data for four different detectors. Irradiation by high energy electrons.*
- *Leakage currents variation for microstrip detectors by irradiation.*

SINGLE CHANNEL SILICON DETECTOR



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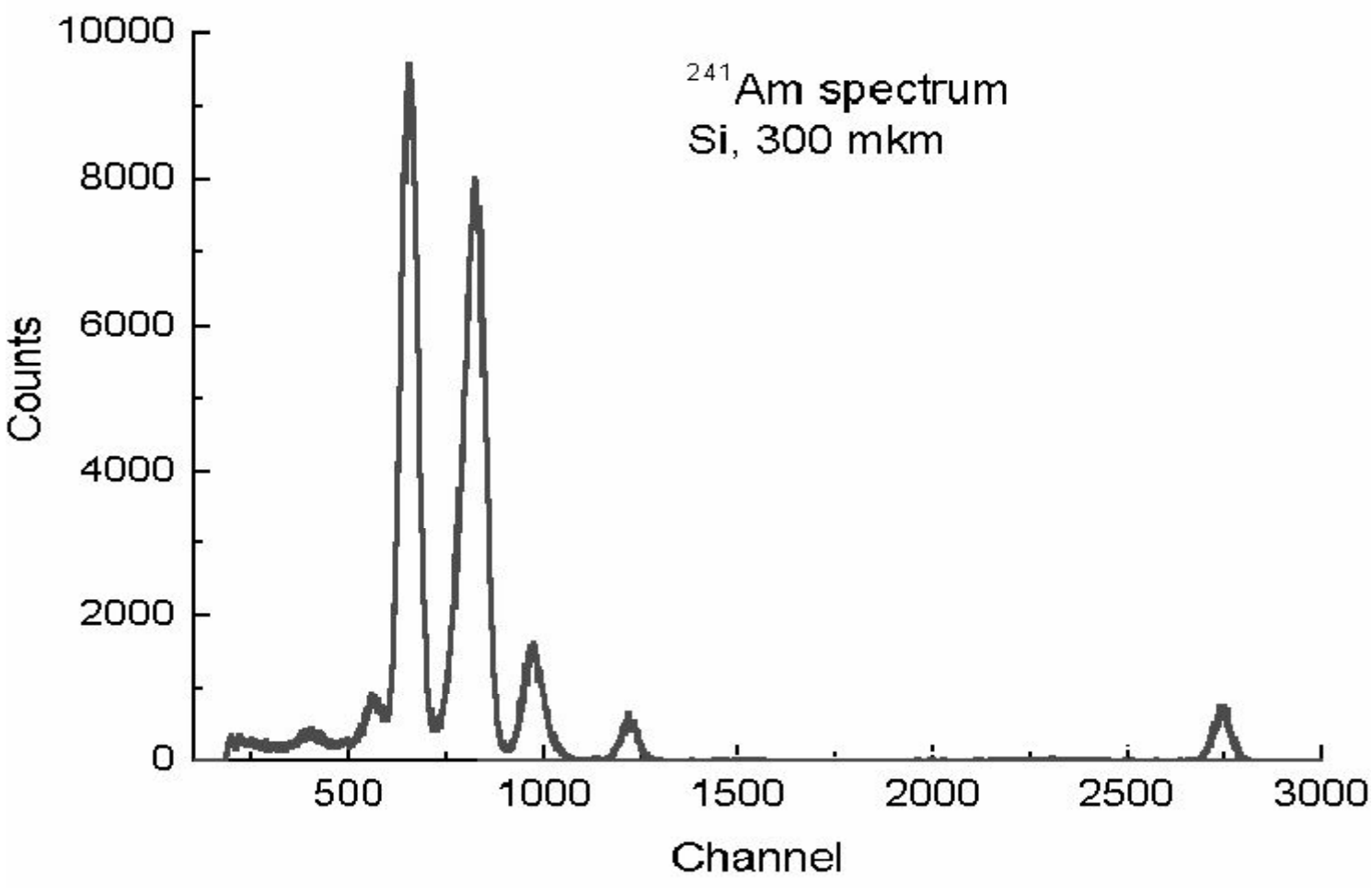
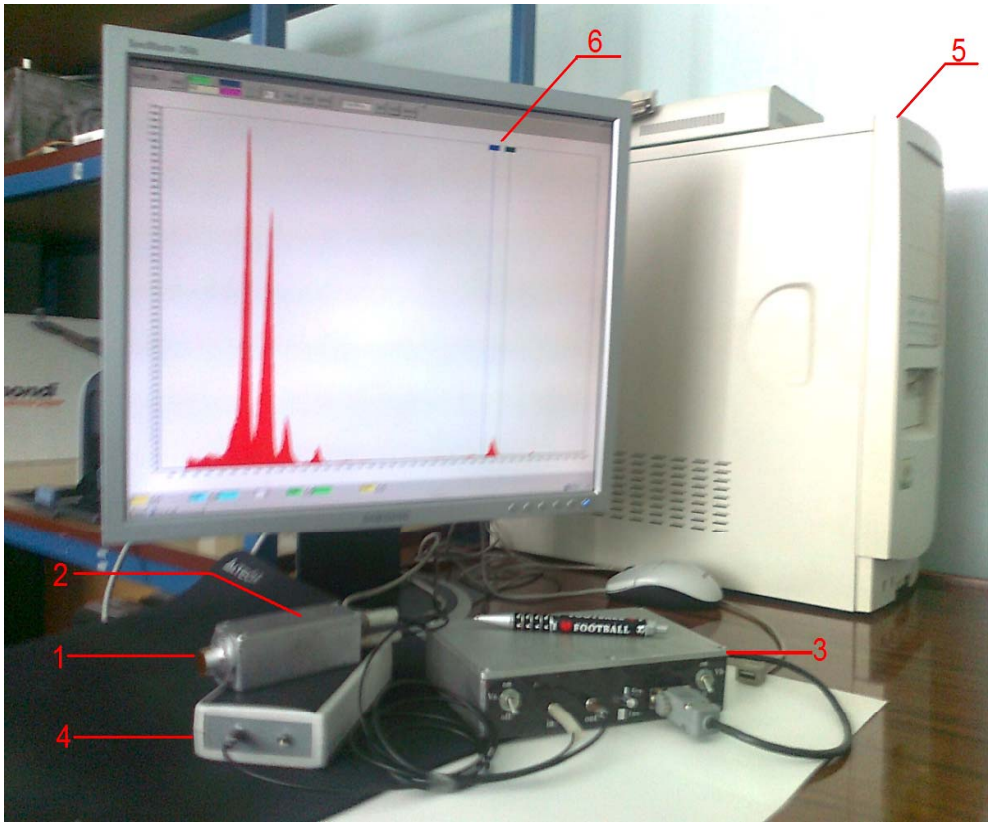
MEASUREMENT OF ENERGY RADIATION BY SPECTROMETER
based on uncooled silicon detector

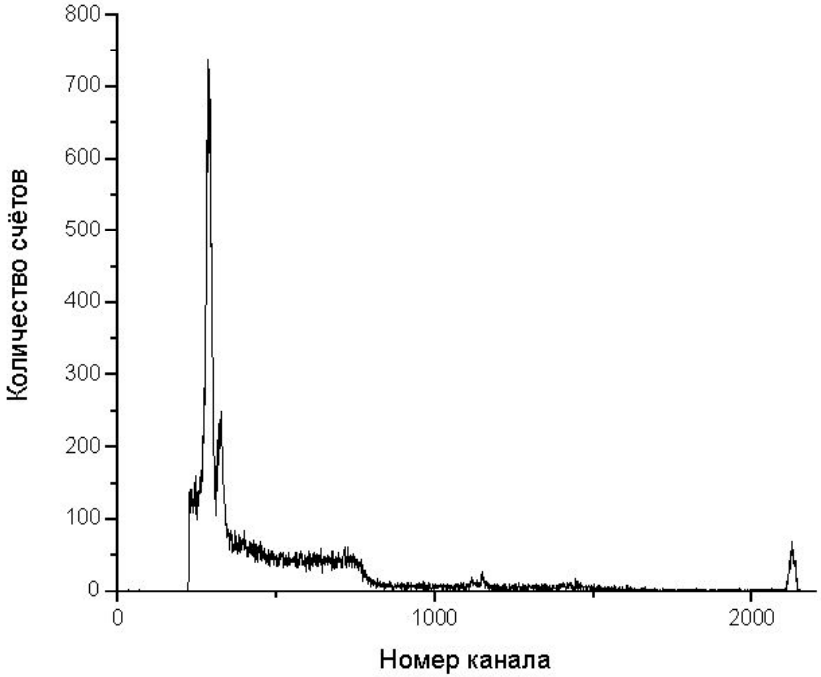


Measurement of radiation of isotope source ^{241}Am using uncooled detector.
The energy resolution of 1.16 keV. Preamplifier with resistive feedback.

Spectrometer analyzer:

1- sealed detector; 2-preamp; 3-module which includes spectrometric amplifier and power supply for amplifier; 4- ADC powered from USB port of the computer; 5-computer; on the monitor (6) fixed set of spectrum.





Tests for the rapid analysis of ^{99m}Tc

The measured spectrum for pharmaceuticals of 8 cm^3 placed in a standard glass vial. The gamma radiation consists of 140-keV line ^{99M}Tc and two peaks of characteristic X-ray radiation

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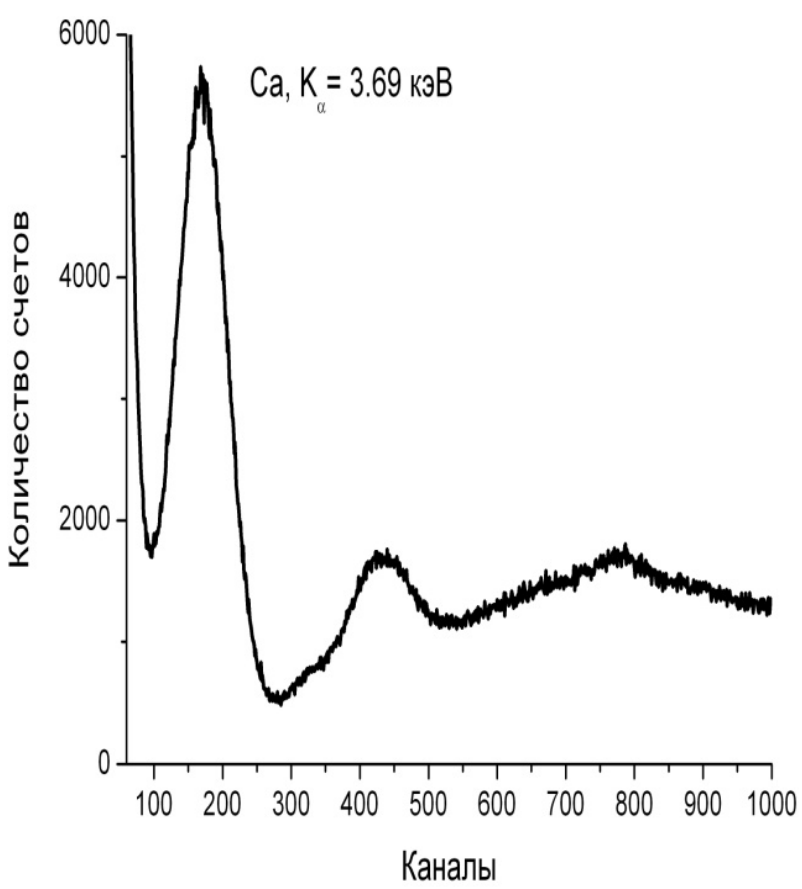
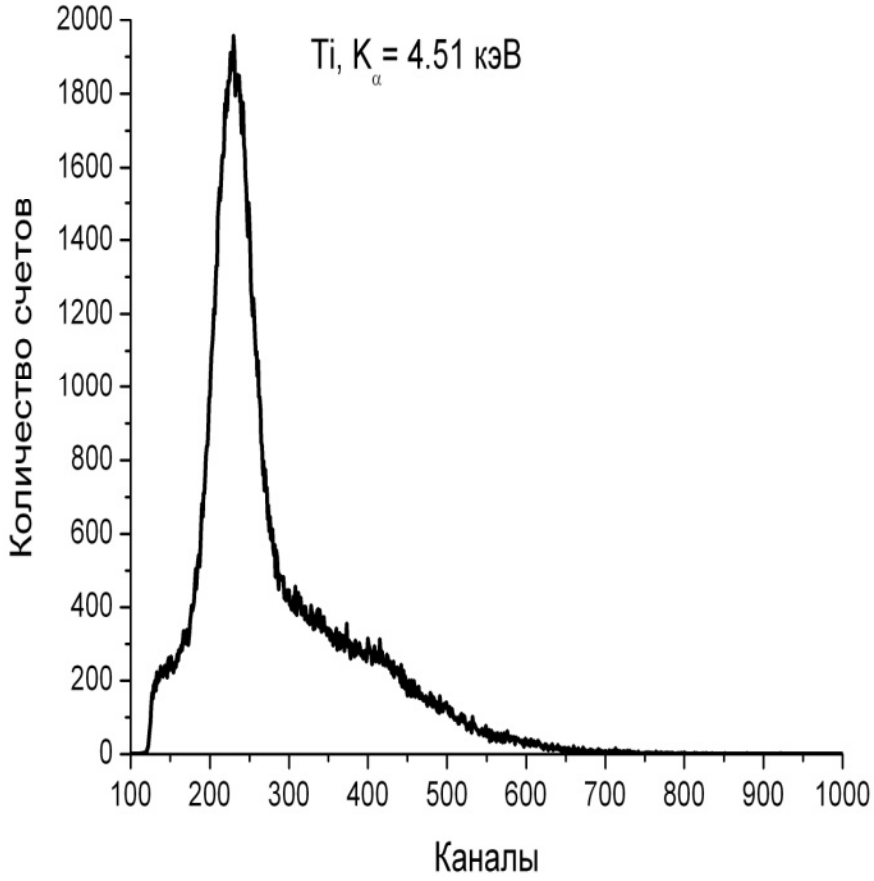
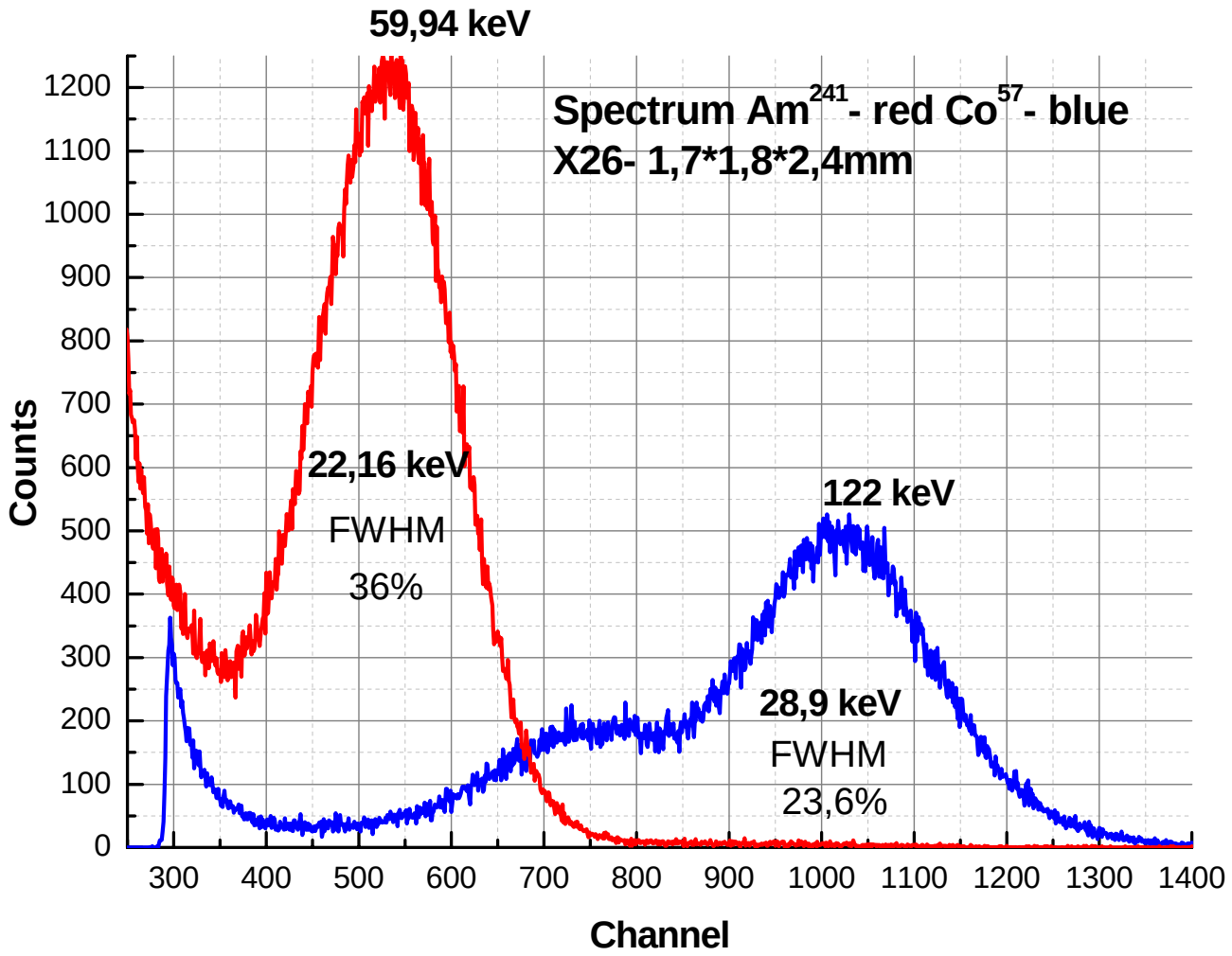
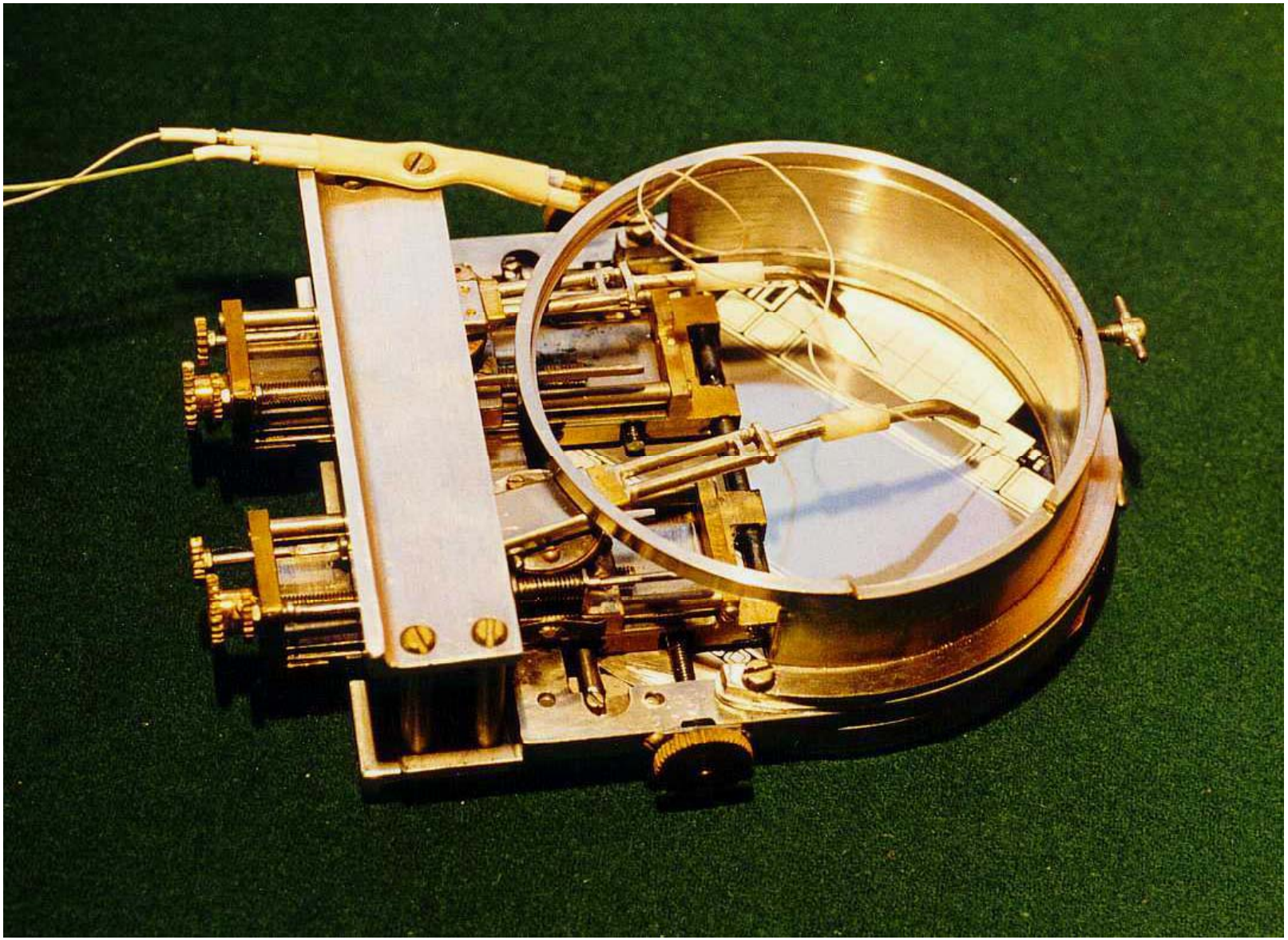




Measurement of the radiation energy using detecting system scintillator CsI (Tl) - Silicon PIN photodiode



MICROSTRIP DETECTOR TESTING. KHARKOV



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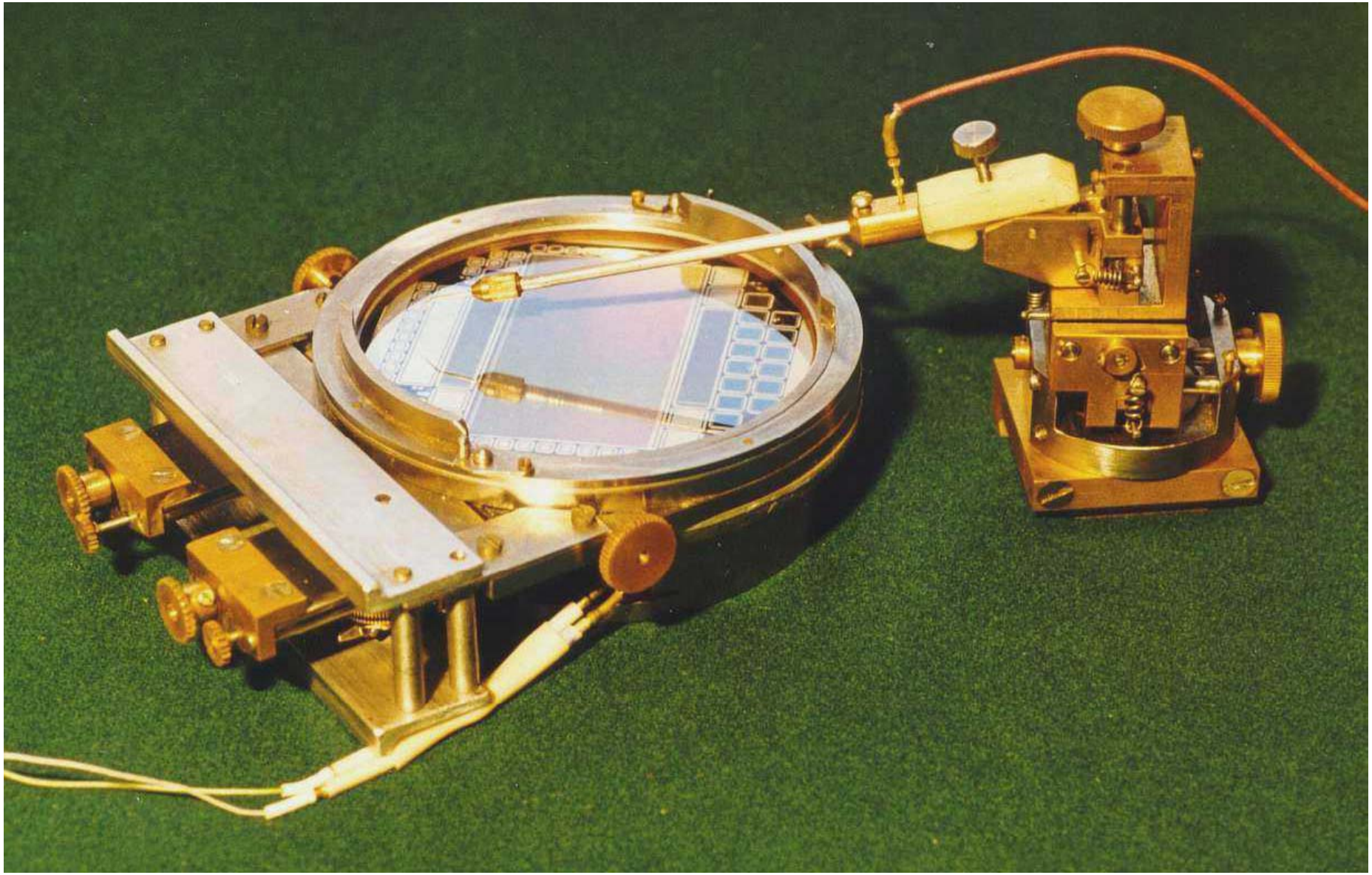

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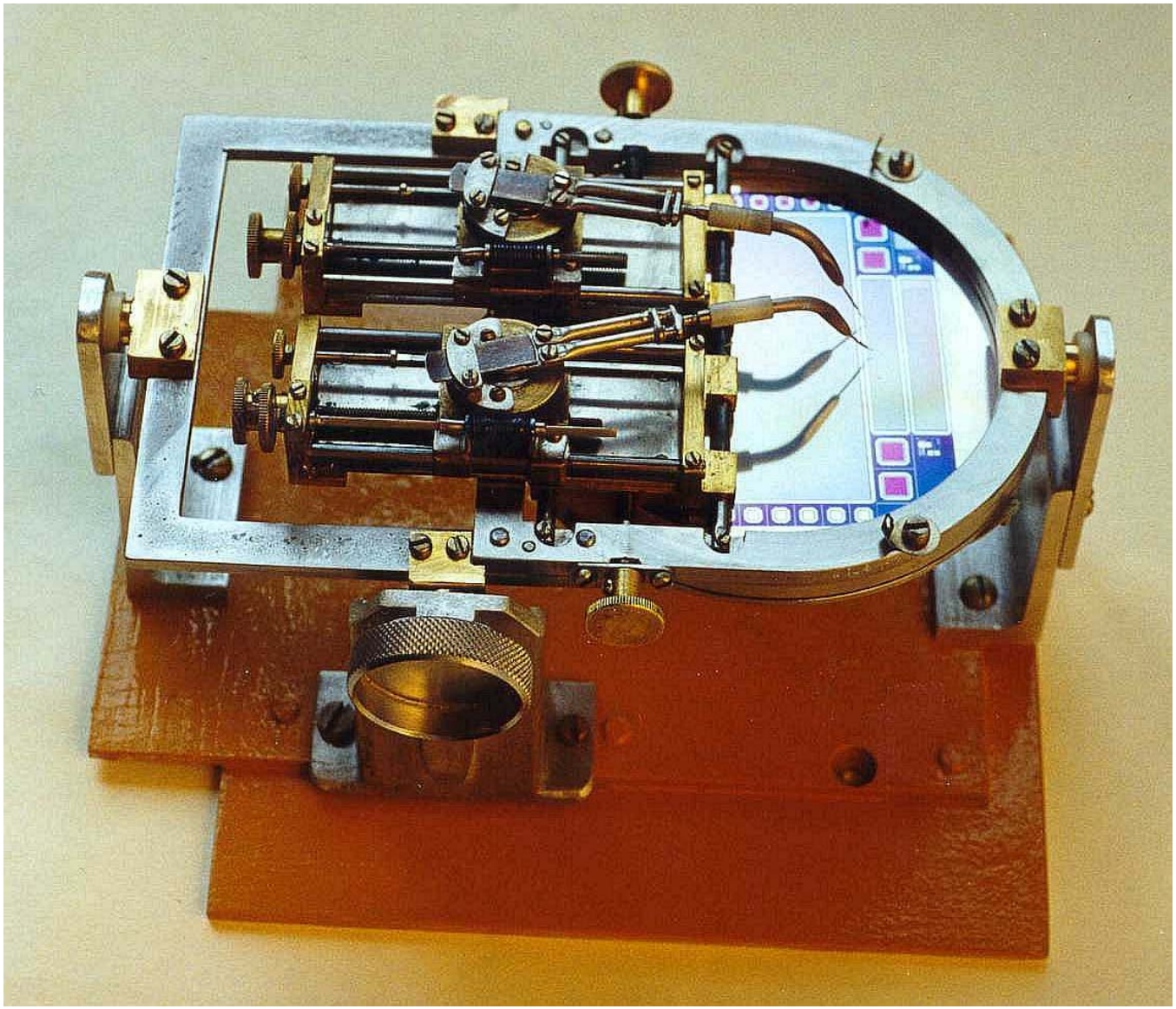

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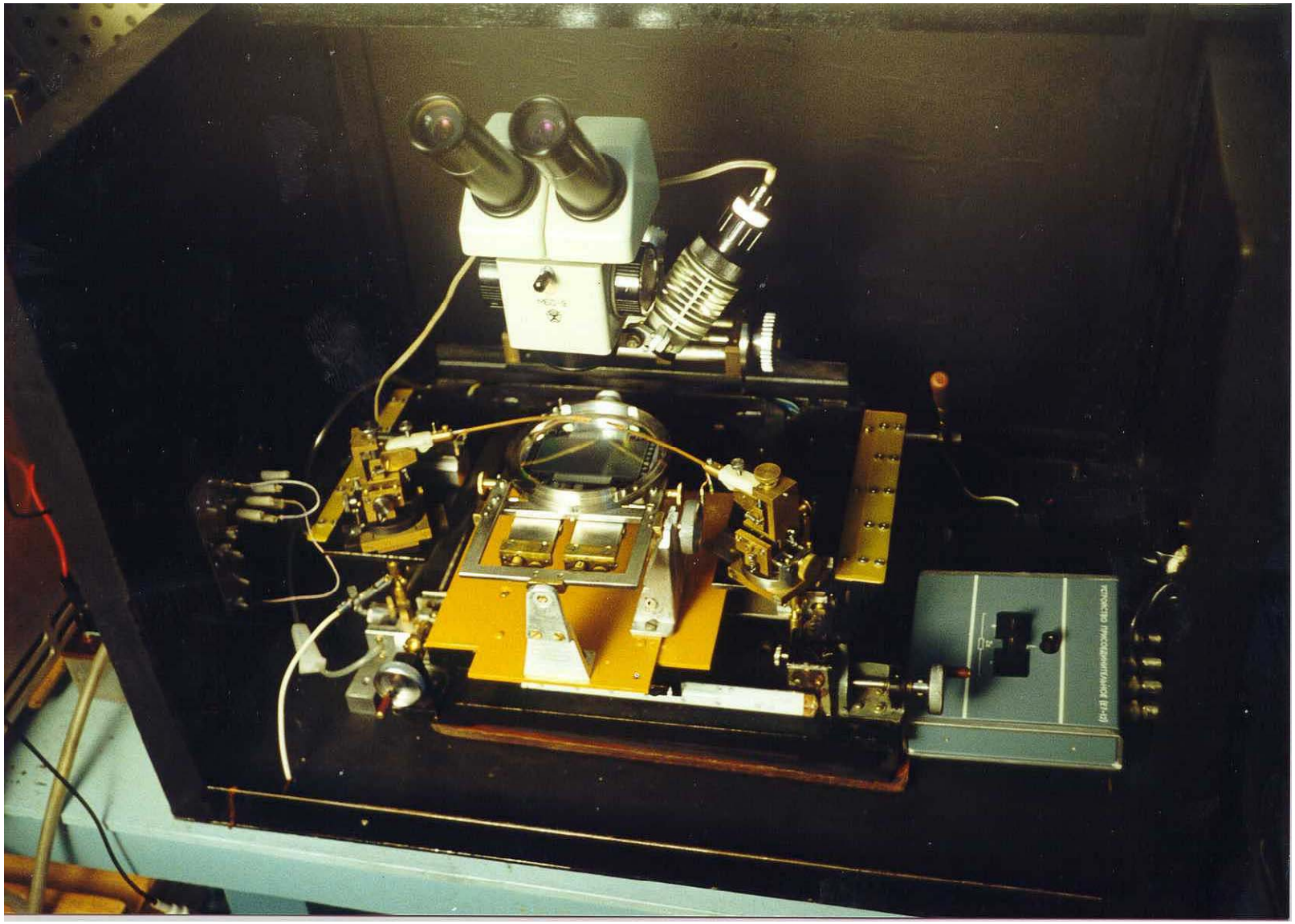

MICROSTRIP DETECTOR TESTING . KHARKOV

MICROSTRIP DETECTOR TESTING . KHARKOV

MICROSTRIP DETECTOR TESTING . KHARKOV

ALICE MICROSTRIP DETECTOR TESTING. TRIESTE

MICROSTRIP DETECTOR TESTING . KHARKOV

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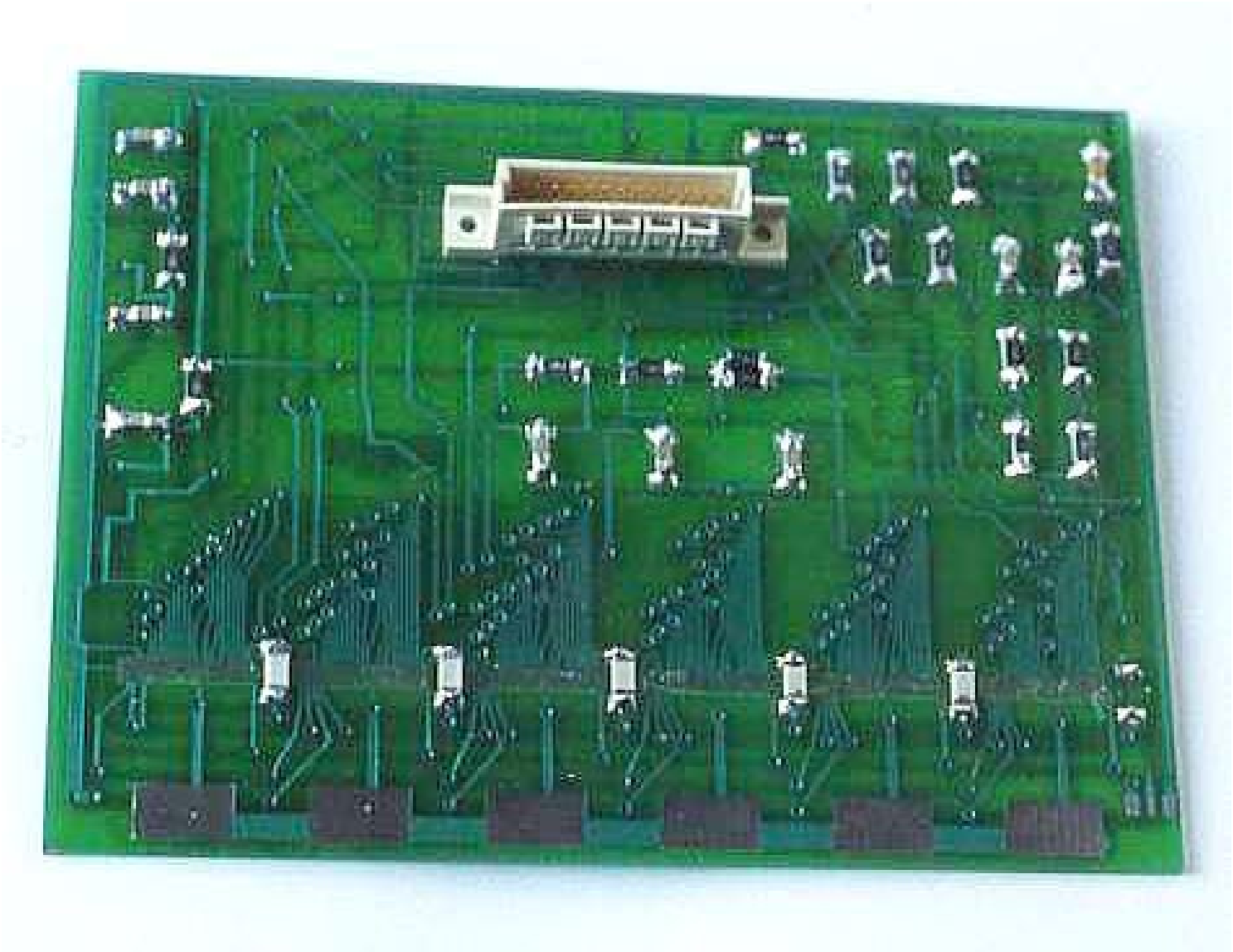

Even when you think that things will take longer, they will take longer than you think