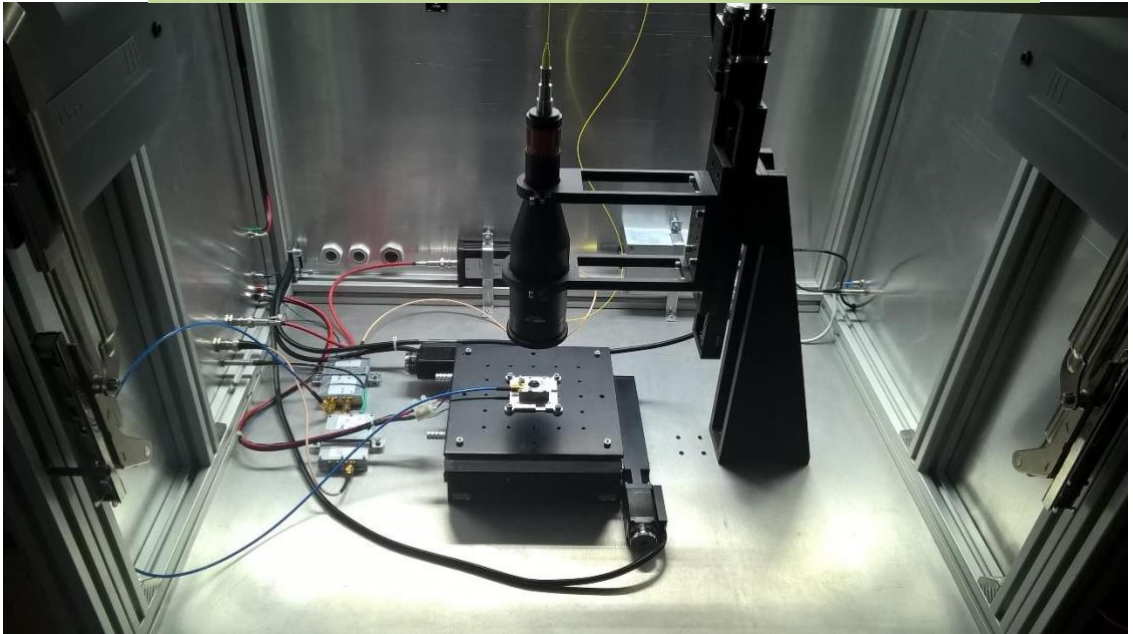# Large Scanning TCT system

Overview

Particulars **Large Scanning TCT System** is a complete setup for measurements of transient currents generated in semiconductor sensors with narrow laser beam. It can be used for standard and Edge-TCT measurements. Edge-TCT enables measurements of charge collection and carrier velocity profiles – crucial for understanding the performance of heavily irradiated detectors.

Features

- wide band current amplifier
- bias-T
- high voltage low pass filter

- laser diode (405, 520, 660, 980, 1064 nm) – wavelengths optional
- programmable laser driver for sub-nanosecond laser pulses
- laser beam optics, beam spot 8 μm FWHM
- XYZ moving stages for precise DUT positioning in the beam and focus tuning

- water cooled Peltier mounting block for DUT temperature control
- aluminium closure for light and RF shielding and atmosphere control, dimensions: 80 cm x 60 cm x 60 cm weight: 55 kg

- hardware control software (connection via USB)
- data acquisition software
- ROOT based package for data analysis

Large-Scanning TCT system

Amplifier

Bias-T

HV low pass filter

- bandwidth 0.01 - 2000 MHz
- bias 6 - 15 V
- amplification 35 dB or 53 dB
- input, output impedance: 50 Ω
- dimensions: 7x5x1.5 cm^3

- max voltage 1 kV or 2 kV
- freq. range: 0.01 - 2000 MHz
- input, output impedance: 50 Ω
- dimensions: 7x5x1.5 cm^3

- filter high frequency interferences from HV power supplies
- max voltage 2 kV

Fibre coupled laser with optics on translation stage

- laser diodes from 405 to 1064 nm
- tunable pulse power equivalent to <1 MIP - >1000 MIP in Si
- tunable pulse width 0.35 ns - 4 ns
- single pulse mode 50 Hz to 1 MHz
- 1024 bits deep pulse sequence
- trigger output
- external trigger
- USB control
- Laser power supply powering also electronics, beam monitor

Sample mounting

- aluminium support block on
  XY translation stage:
  < 1 µm precision, 50 kg load, 10 cm range
- block fixed to cooled Peltier element
  (200 W, ΔT ~ 20 °C)
- PT100 for temperature measurement
- easy isolation of samples
- dry air inlets in the experimental box for avoiding condensation

mounting block

PT100

coolant
circulation

sample mount
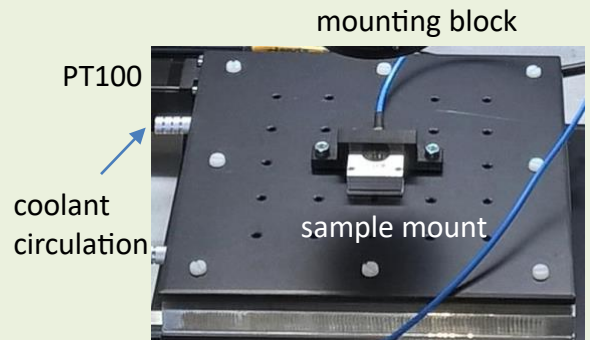
Software

- executables with GUI for complete measurement control:
  laser control, stage movement, data acquisition
- ROOT based package for analysis of TCT signals

ALIBAVA SYSTEMS