

Scanning systems

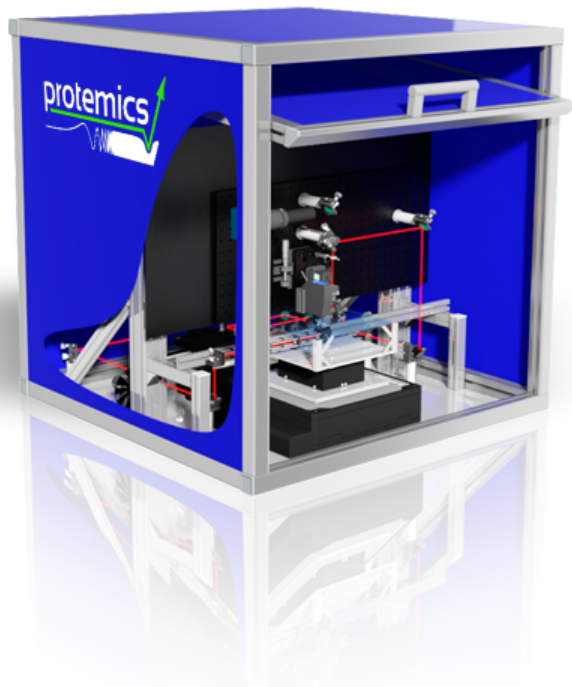
Our scanning system solutions are the ideal modular platform for THz near-field imaging applications of any kind. All system components are optimized for the utilization of TeraSpike microprobes at maximum performance.

Standard scanning system configurations may be combined with a suitable laser systems on customer side or can be extended with a new laser source for optical excitation.

Scanning systems are designed for applications such as:

- THz Metamaterial research and sensing application
- Semiconductor wafer inspection
- Sheet resistance imaging
- Graphene analysis
- THz device characterization
- Microstructure analysis
- Non-destructive testing

TeraCube Scientific



The new lab-type THz near-field micro-probe scanning system

The *TeraCube Scientific* is a fully automated THz near-field scanning system to be operated in an optical laboratory surrounding. It can be driven by an existing fs-laser source with suitable specifications or extended with a new laser source. The system enables time-domain measurements of THz field distributions in a controlled distance of a sample surface. The system provides broadband THz pulse excitation and transmission through planar samples as well as spatially and temporally resolved detection of the transmitted pulses in the surface near-field using Protemics proprietary TeraSpike near-field microprobes.

Key features:

- High-speed data acquisition for continuous move scanning through synchronized motion-control and real-time position detection

- Optical sample topography detection for adaptive THz surface scanning at constant microprobe/surface-distance on structured or bended samples
- Linear polarized and rotatable THz emitter for polarization-dependent measurements
- High performance THz emitter/detector components plus high dynamic range Lock-in detection for outstanding signal quality
- Integrated CCD camera module for monitoring of microprobe tip and sample position
- System control and measurement automation software with easy to operate graphic user interface readily installed on included PC unit
- Software-implemented alignment monitoring function and system health check electronics
- Software assisted microprobe-tip to sample surface approximation
- Time-domain signal preview mode for fast optical alignment alignment
- Data-export as plain-text or Matlab-compatible format
- System housing for laser and dust protection
- Open extendable lab-type system platform

Technical Specifications

Type	TeraCube Scientific
Spectral range	0.05 - 4 THz
Maximum sample size (x, y, z)	20 cm, 20 cm, 1 cm
Maximum scanning speed (x, y) without load	750 mm/s
Min. scanning time per pixel	10 ms
Maximum scanning range (x, y, z)	18 cm, 18 cm, 3 mm
Time-domain scanning range width	1000 ps
Time-domain step resolution (dt)	6.6 fs
Min. bi-directional repeatability (x, y, z)	+0.1 μ m, +0.1 μ m, +0.15 μ m
Min. step resolution (dx, dy, dz)	3 nm, 3 nm, 2 nm

Installation requirements

Vibration-damped optical table with 1m x 1m x 1m of space for system placement
Laser laboratory specification of class 3b or higher

fs-Laser requirements

Center wavelength: 770 nm ... 820 nm
Repetition rate f: 10 MHz ... 1 GHz
Avg. optical power P: 60 mW ... 1.5 W
Pulse duration: < 150 fs

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