Our new all-fiber THz spectrometer for fast data acquisition is based on the novel OSCAT (Optical Sampling by CAVity Tuning) technique. It enables THz time-domain spectroscopy without any moving parts. Combined with our TERA Image extension, the system provides a solution for fast THz imaging applications. Similar to the ASOPS technique, the OSCAT offers great flexibility in system configuration and capability of high-speed measurements. TERA OSCAT is a robust and portable solution for both laboratory use and OEM integration, suitable even for harsh industrial environment.

**TERA OSCAT**

All-Fiber THz Spectrometer
For Rapid Scan Applications

**KEY SPECIFICATIONS**
- Rapid Sampling Rate: >200 waveforms / s
- Total Scan Range: up to 4 ns (pulse-to-pulse, virtually unlimited)
- Scan Mode: Rapid / Step Scan

**APPLICATIONS**
- THz Imaging
- THz Spectroscopy
- Quality Inspection
- THz Remote Sensing

**FEATURES**
- Designed for High-Speed Measurements
- Robust and Portable
- Compact Fiber Coupled Configuration
- High Flexibility of System Configuration

**OPTIONS**
- TERA Image
  Automated XY translation stage for THz imaging
- Reflection Guide
  For quick manual adjustment of transmission or reflection geometry

**SYSTEM LAYOUT**

![System Layout Diagram]

**PRINCIPLE OF OPERATION**

In the OSCAT technique there is no need for an external moveable delay line. Contrary to the conventional THz-TDS systems, the lengths of the emitter and detector arms are not balanced. The temporal shift $\Delta \tau$ between the pulses $i$ (emitter arm) and $i+a$ (detector arm) is determined by the repetition rate $f_{\text{rep}}$ of the fs laser.

$$\Delta \tau = \frac{1}{f_{\text{rep}}} - \frac{1}{f_{\text{rep}} + \Delta f}$$

TERA OSCAT
All-Fiber THz Spectrometer

**THZ SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>THz Antenna Model</td>
<td>TERA15-FC*</td>
</tr>
<tr>
<td>Scanning Mode</td>
<td>step and rapid</td>
</tr>
<tr>
<td>Spectral range</td>
<td>&gt;3 THz in step mode, &gt;1 THz in rapid mode</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>&gt;60 dB in step mode, &gt;35 dB in rapid mode</td>
</tr>
<tr>
<td>Rapid Scan Range</td>
<td>up to 40 ps</td>
</tr>
<tr>
<td>Total Scan Range</td>
<td>up to 4 ns (pulse-to-pulse, virtually unlimited)</td>
</tr>
<tr>
<td>Rapid Sampling Rate</td>
<td>&gt;200 waveforms/s</td>
</tr>
<tr>
<td>Laser Output Ports for THz</td>
<td>Two fiber coupled ports, 1560 nm, FC/APC, PM fiber, 2.5 m and OSCAT delay fiber</td>
</tr>
<tr>
<td>Laser System Repetition Rate</td>
<td>250 MHz, modulation for OSCAT scanning</td>
</tr>
</tbody>
</table>

*See product data sheet for technical specifications

**SYSTEM DIMENSIONS AND WEIGHT**

<table>
<thead>
<tr>
<th>System</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optomechanical Setup</td>
<td>540 x 450 x 200 mm³, 34 kg</td>
</tr>
<tr>
<td>OSCAT Control Electronics</td>
<td>please ask</td>
</tr>
</tbody>
</table>

**SYSTEM COMPONENTS**

- **Optical Breadboard**: Femtosecond laser source with OSCAT delay fiber, Fiber coupled THz emitter and receiver modules, THz TPX polymer lenses
- **Control Electronics**: laser control electronics, OSCAT electronics based on our SYNCRO platform for laser repetition rate control, PC and software package for measurement and data analysis

**PHOTOGRAPHY**

PA6 plate with laminar interspace

Data acquisition time: 1/60 s

**THz IMAGING RESULTS**

laminar interspace and air bubbles or shrinkholes are clearly visible

Data acquisition time: approx. 5 hr

with TERA K15

Data acquisition time: approx. 15 min

with TERA OSCAT

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>TERA OSCAT</th>
</tr>
</thead>
</table>

Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.