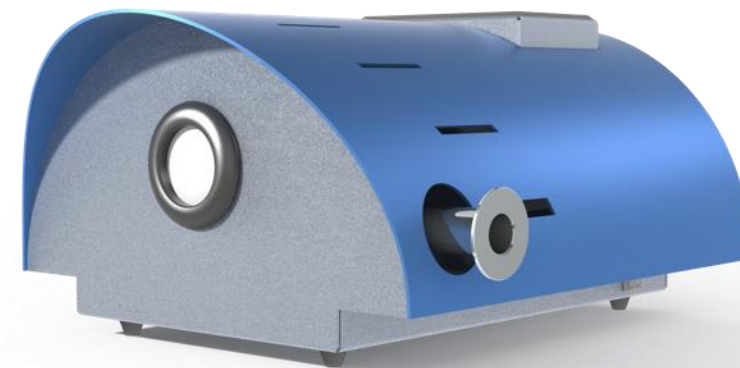


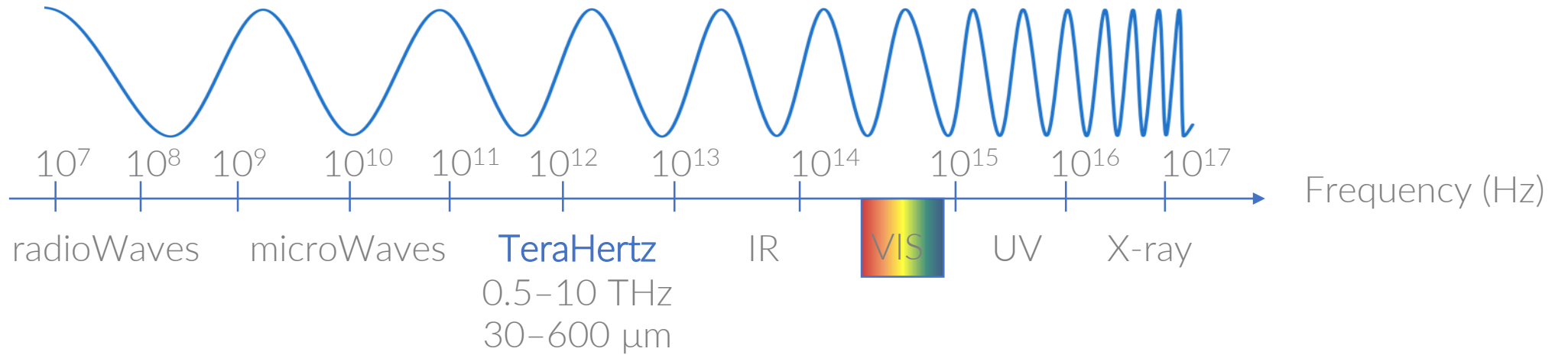
Commercial & compact TeraHertz sources



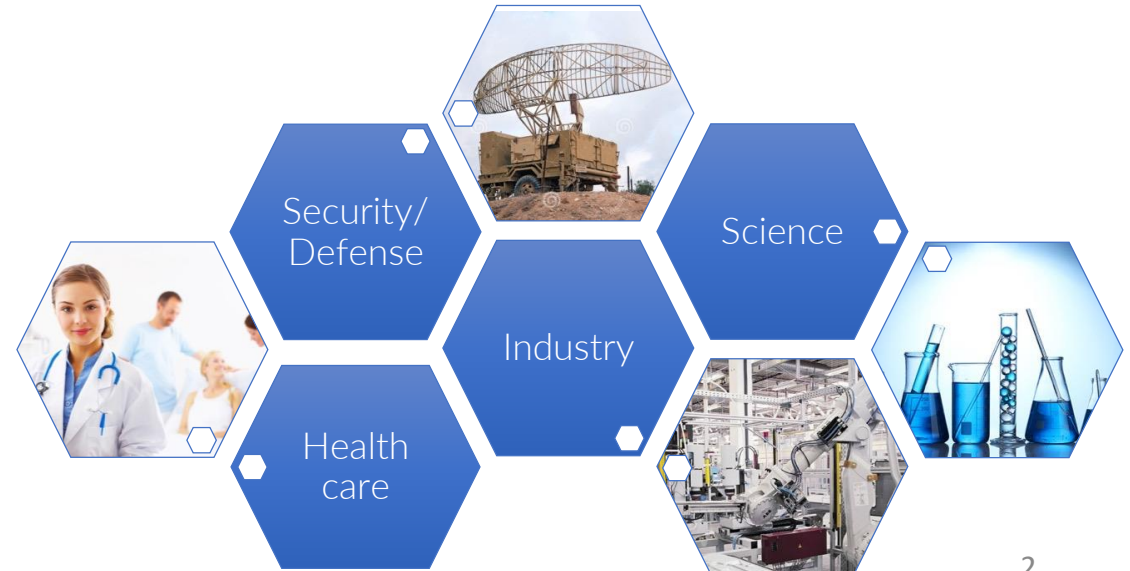
Bringing state of the art, to the industry



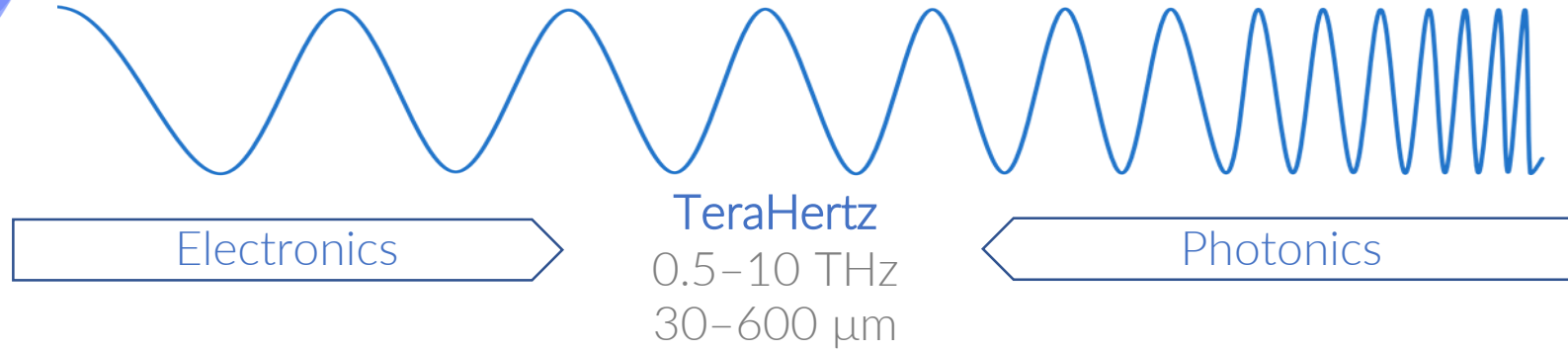
The THz radiation



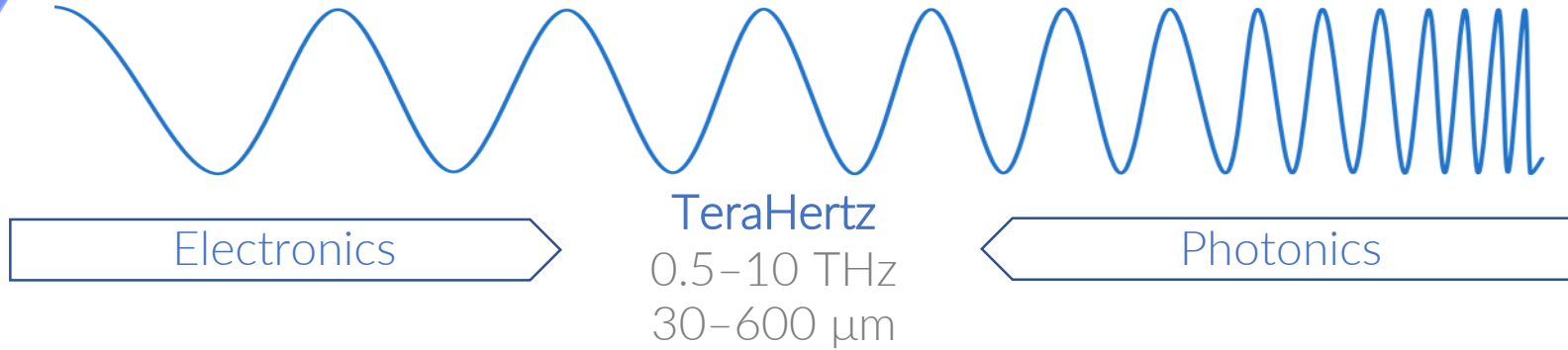
- Non-ionizing radiation, safe for health
- Penetrating non-polar, non-metallic material
- Sensitive to water content



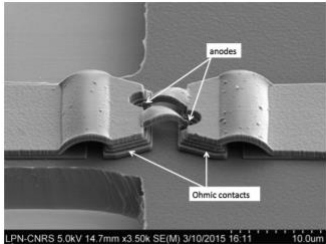
The THz gap is closing



The THz gap is closing



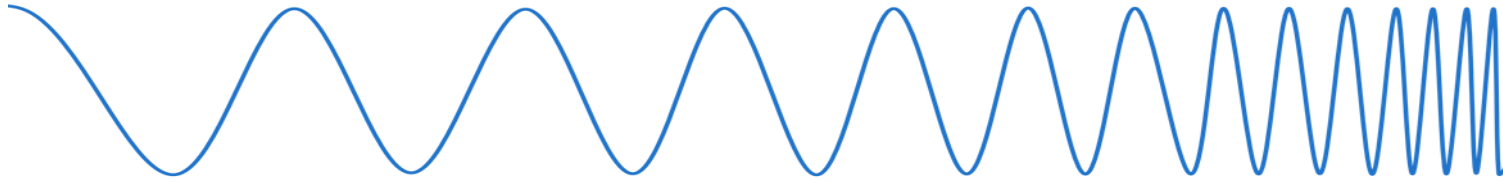
Electronic solid state oscillator
and multipliers



Free Electron Lasers



The THz gap is closing

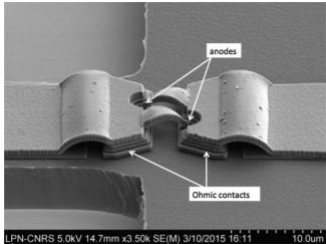


Electronics

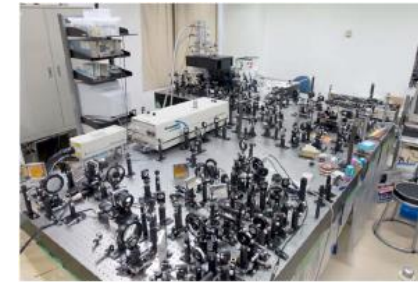
TeraHertz
0.5–10 THz
30–600 μm

Photonics

Electronic solid state oscillator
and multipliers

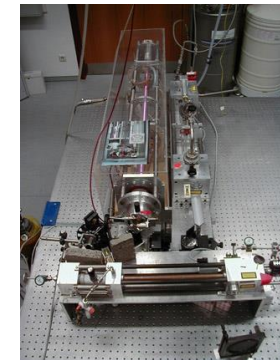


Free Electron Lasers

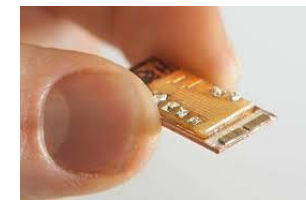


Laser driven THz emitters

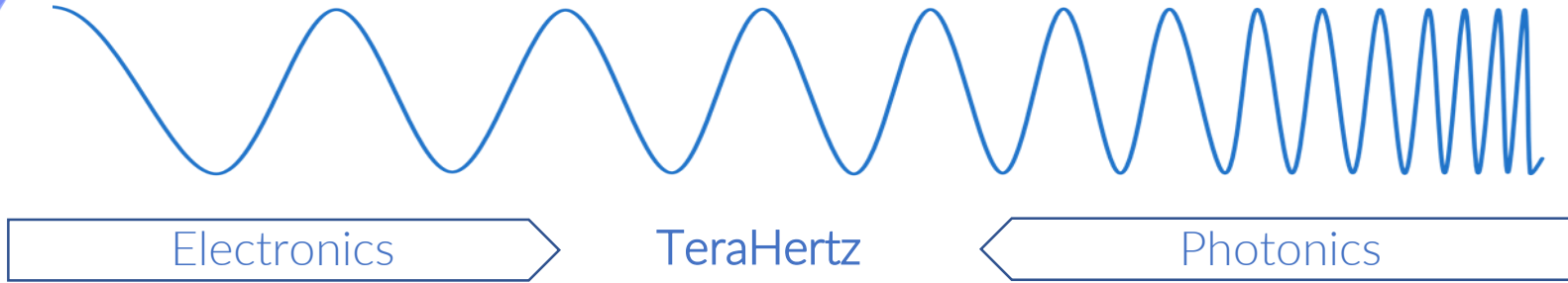
Optically pumped gas laser



Quantum Cascade Laser



The THz gap is closing

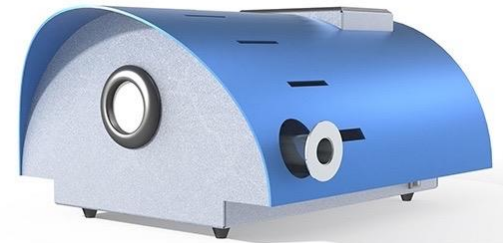


Electronic solid state oscillator
and multipliers



TeraSchottky

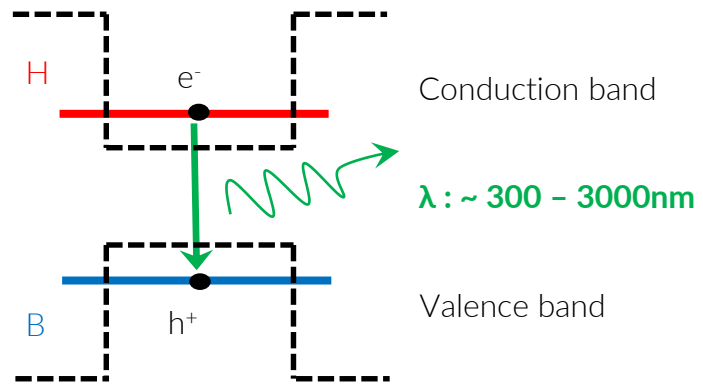
Quantum Cascade Laser



TeraCascade



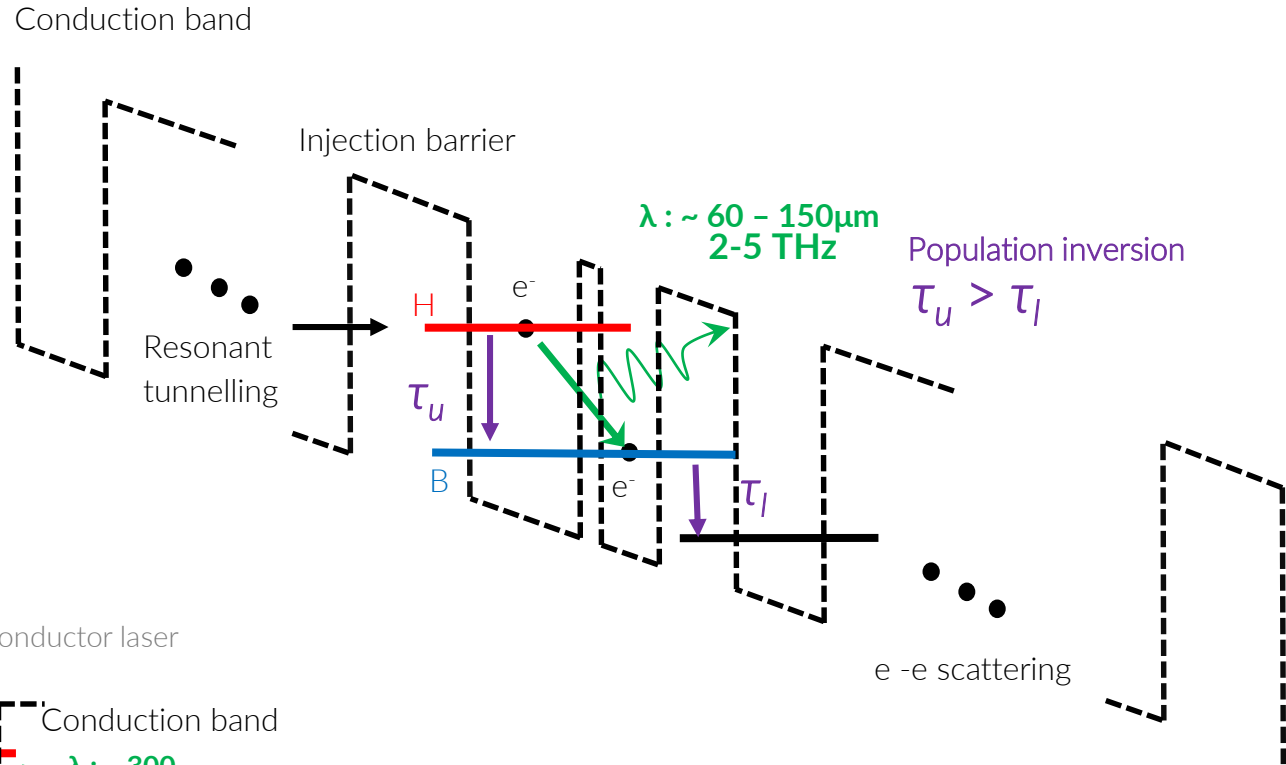
Semiconductor Laser



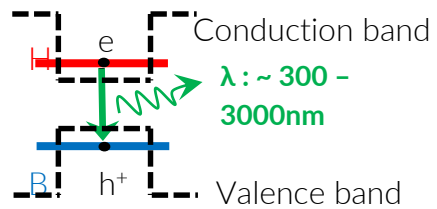
Bipolar semiconductor laser

Innovation of Quantum cascade laser

Unipolar semiconductor laser

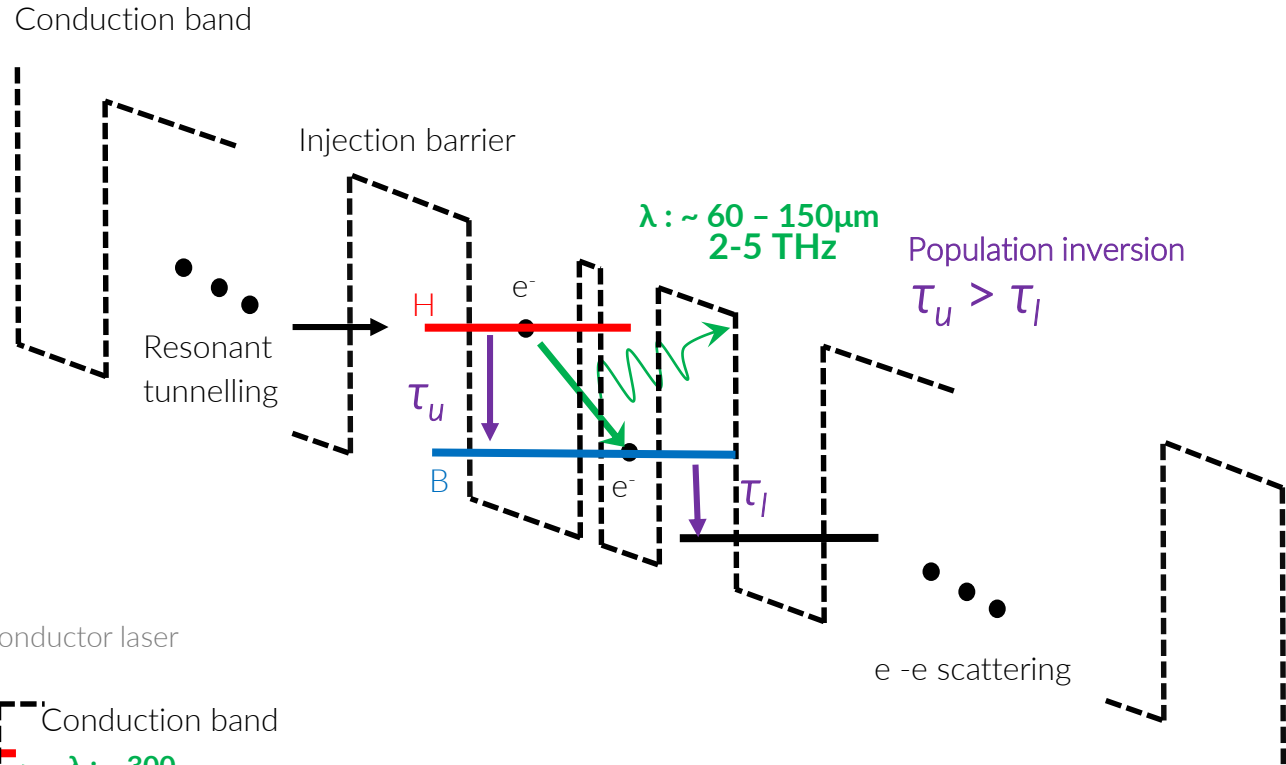


Bipolar semiconductor laser

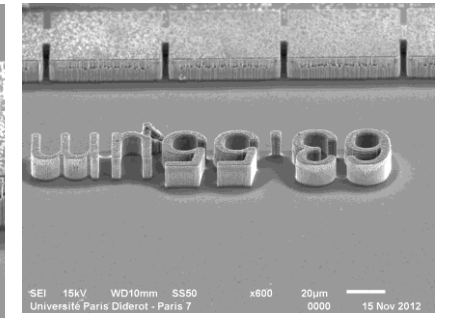
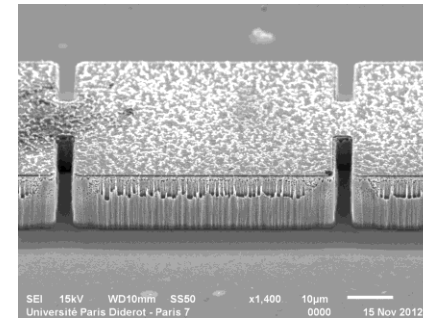


Innovation of Quantum cascade laser

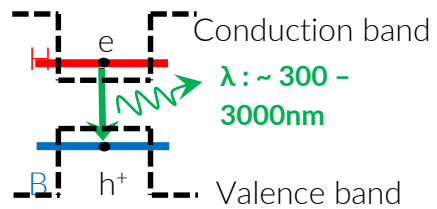
Unipolar semiconductor laser



GaAs/AlGaAs AR: 10-15 μm



Bipolar semiconductor laser





Innovation of Quantum cascade laser

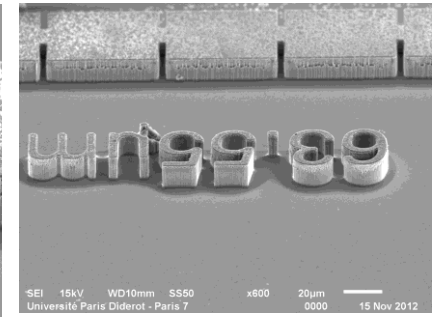
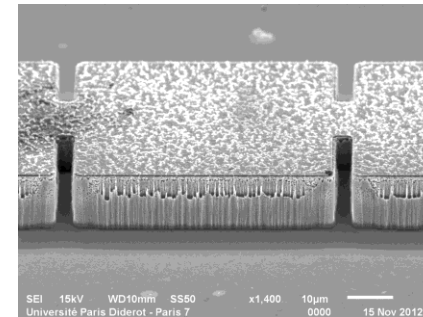
Advantages :

- Direct emission of THz radiation

Drawback:

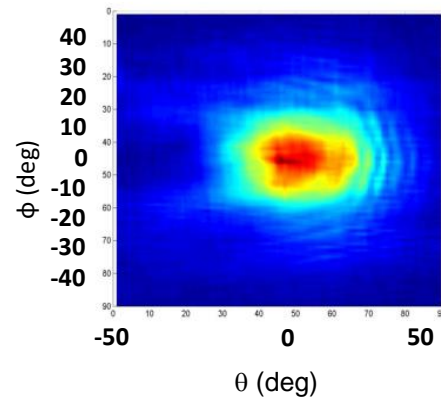
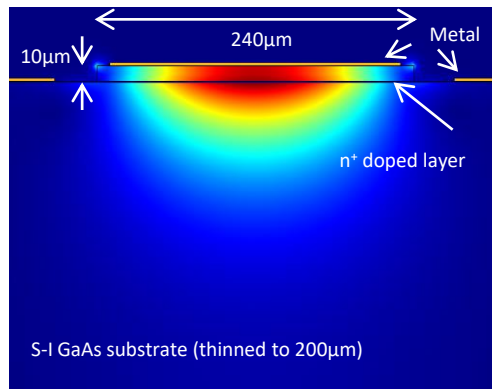
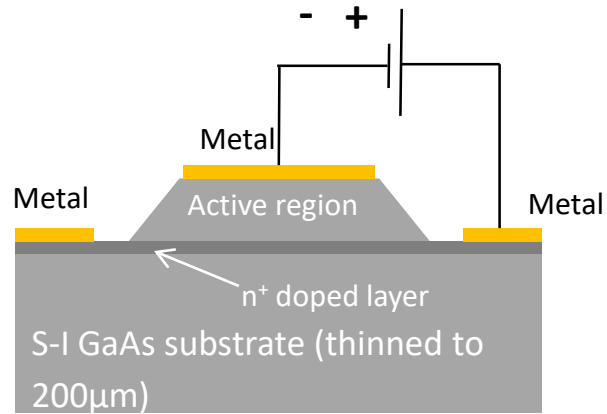
- Cryogenic operating temperatures

GaAs/AlGaAs AR: 10-15 μm



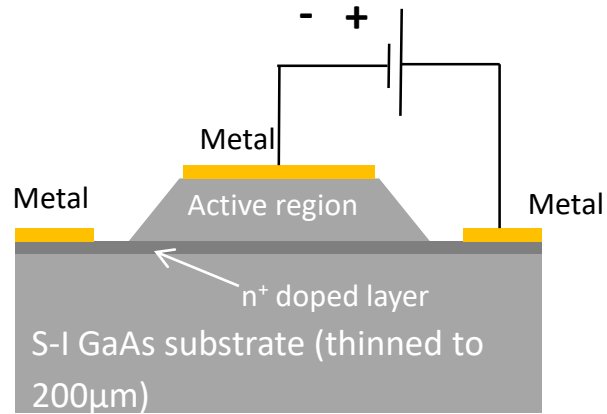
QCL THz waveguides

Single plasmon waveguide

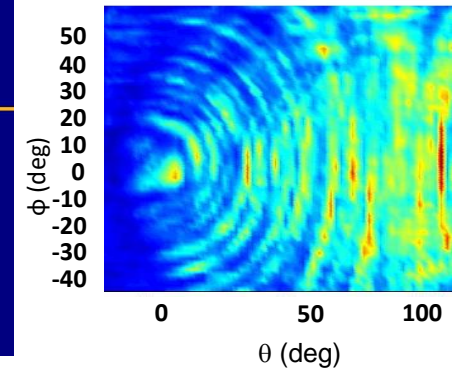
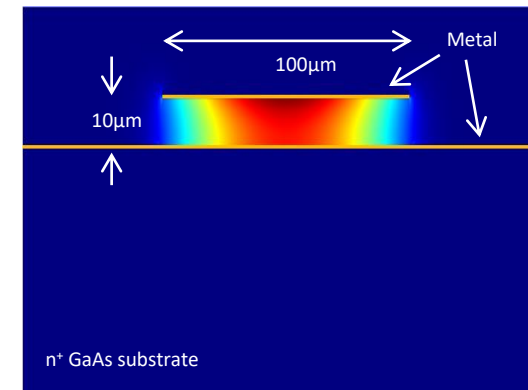
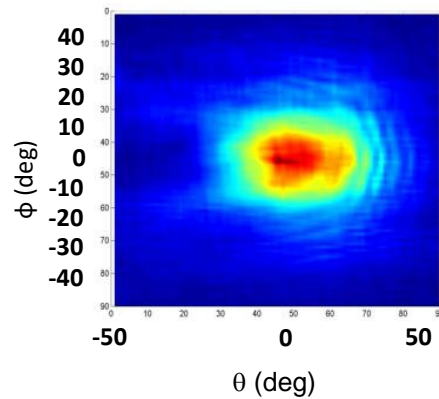
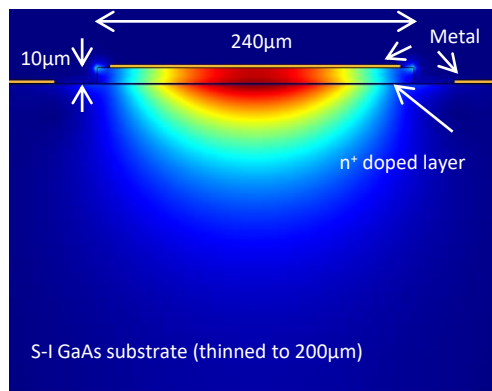
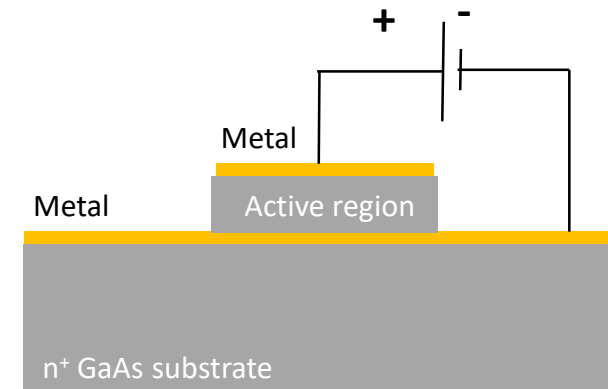


QCL THz waveguides

Single plasmon waveguide



Metal-metal waveguide





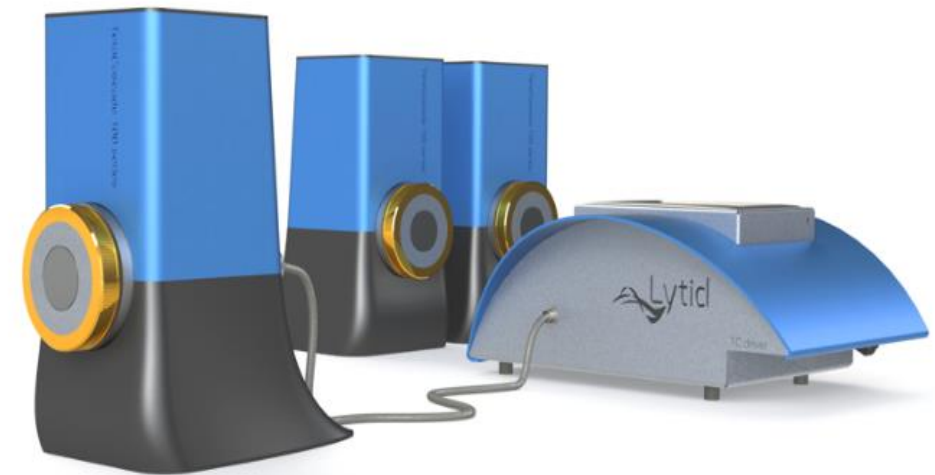
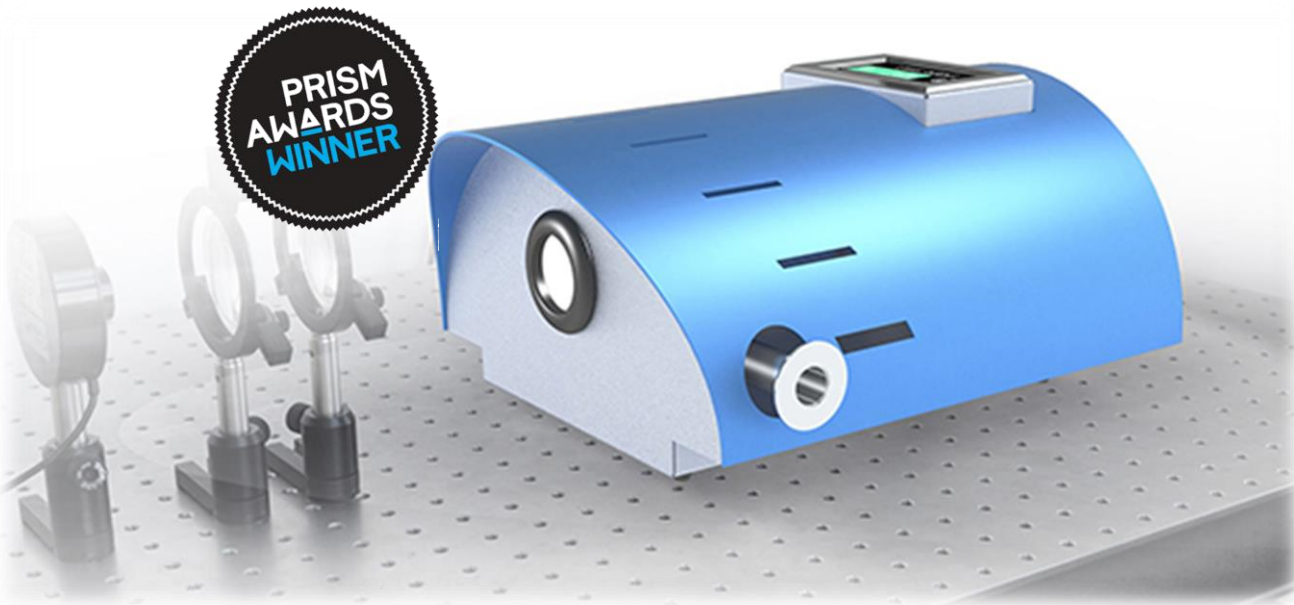
Lytid QCL solution

TeraCascade1000

- Single plasmon waveguide
- Cryogenic free cooling: stirling motor to 40 K
- mW output power

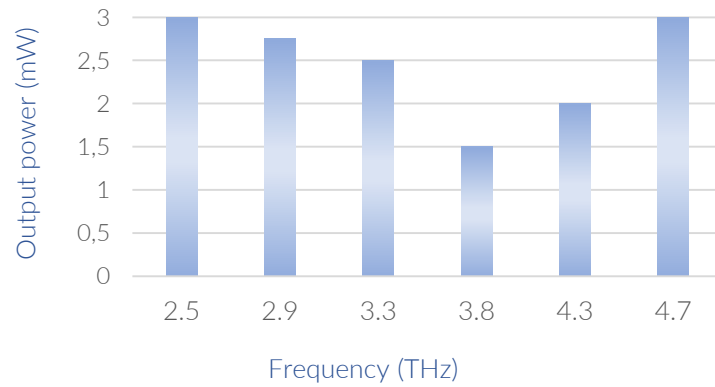
TeraCascade100

- Metal-metal waveguide
- Cryogenic cooling: NL to 77 K
- μ W output power



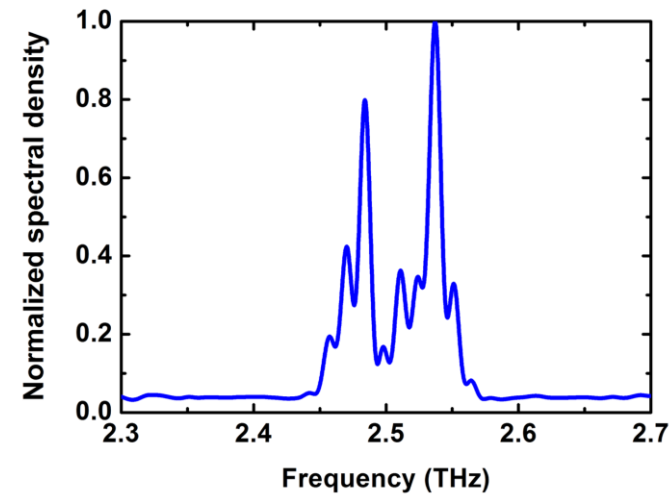
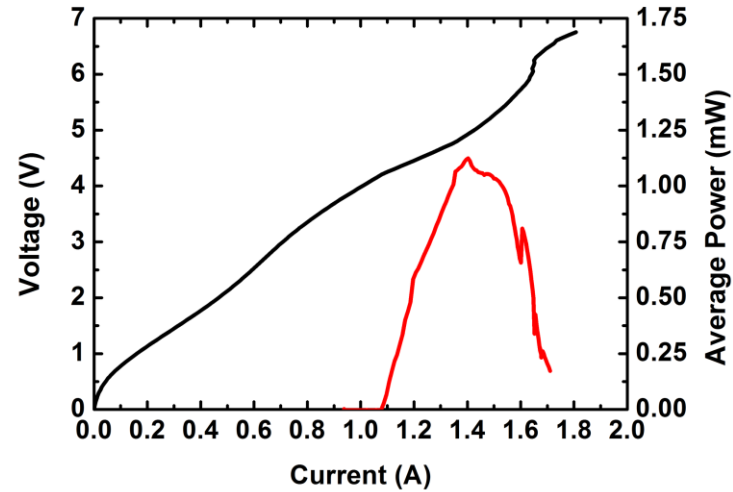
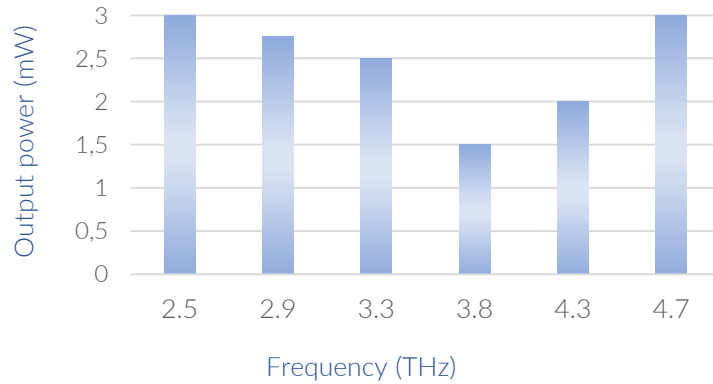


TC1000: frequencies & architecture



TC1000: frequencies & architecture

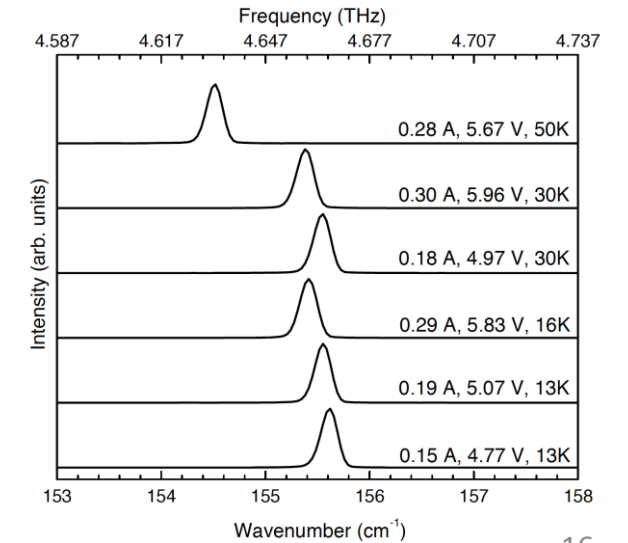
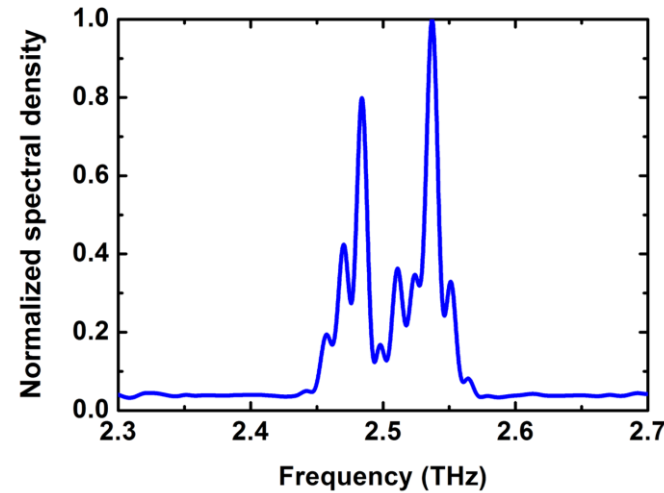
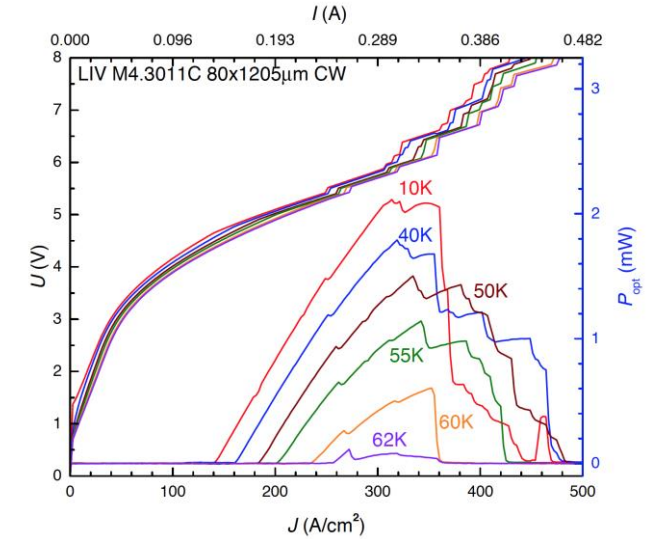
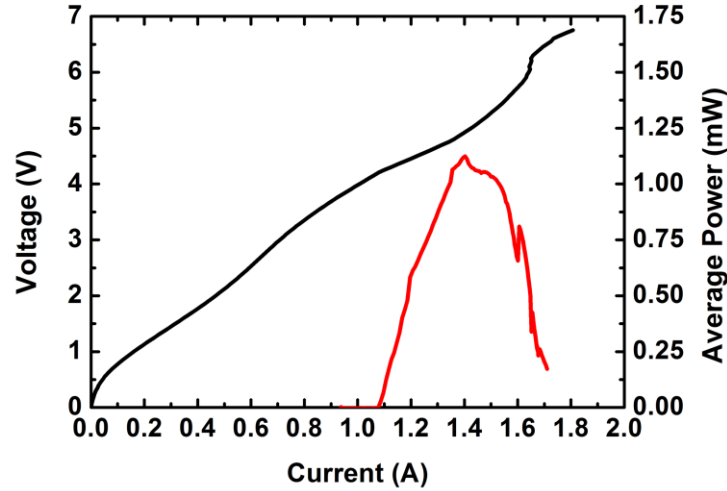
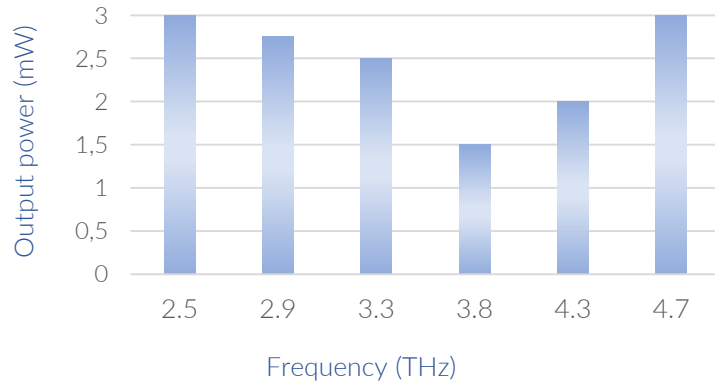
Fabry-Perot laser @ 2.5 THz



TC1000: frequencies & architecture

Fabry-Perot laser @ 2.5 THz

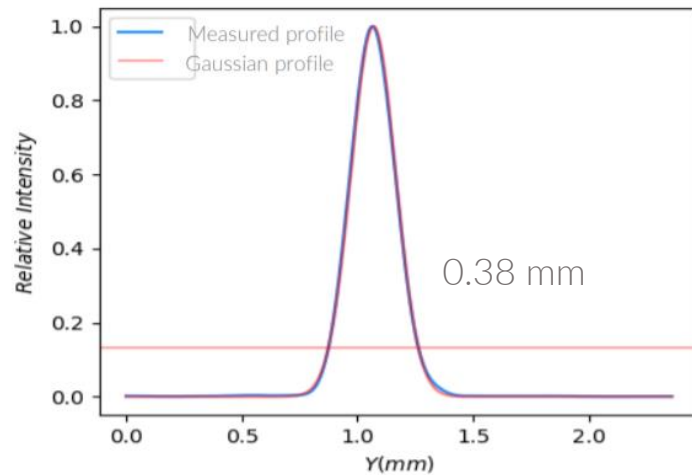
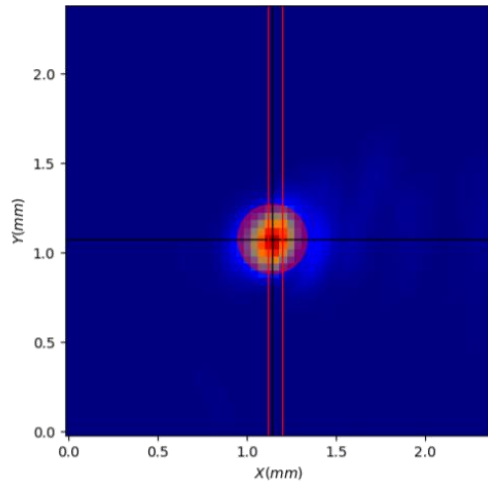
DFB @ 4.7 THz



TC1000: Beam profile and power stability

Beam profile
Single Plasmon

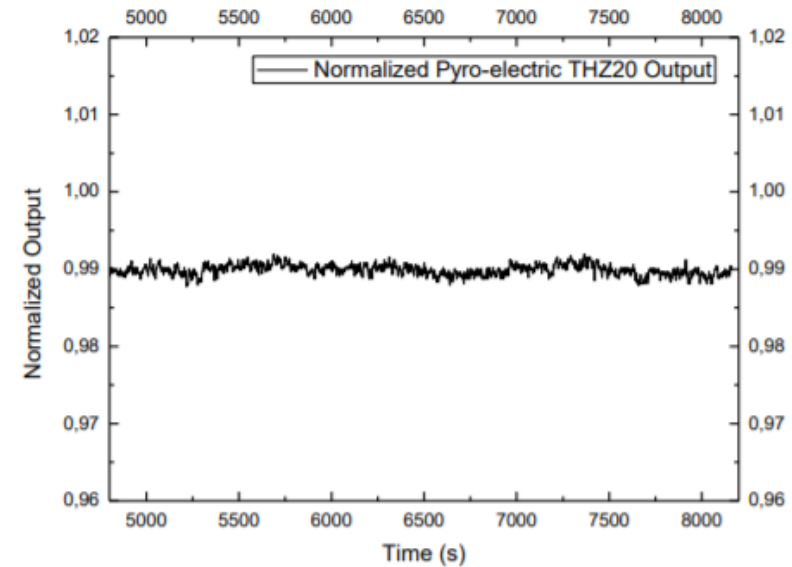
$M^2 = 1,17$



Power stability @ 2.5 THz

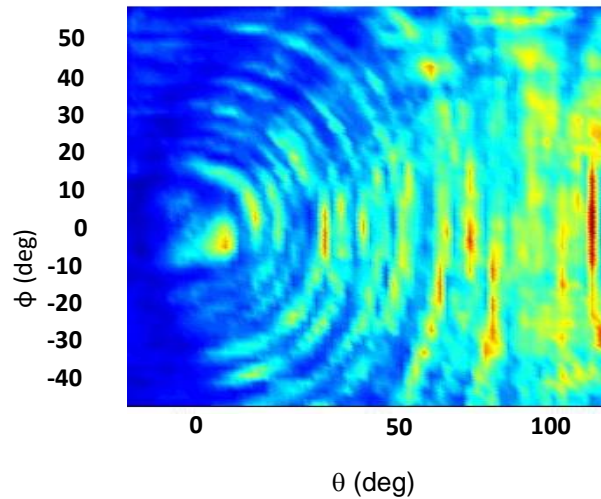
1% over 1 hours

2% over 12 hours

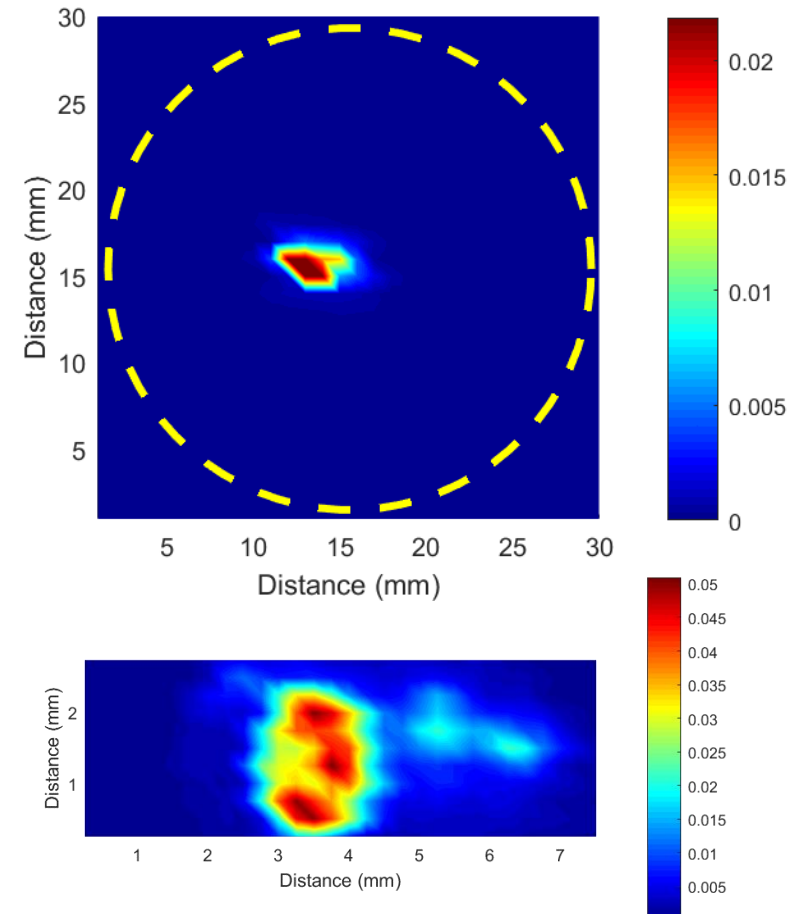


TC100: beam profile

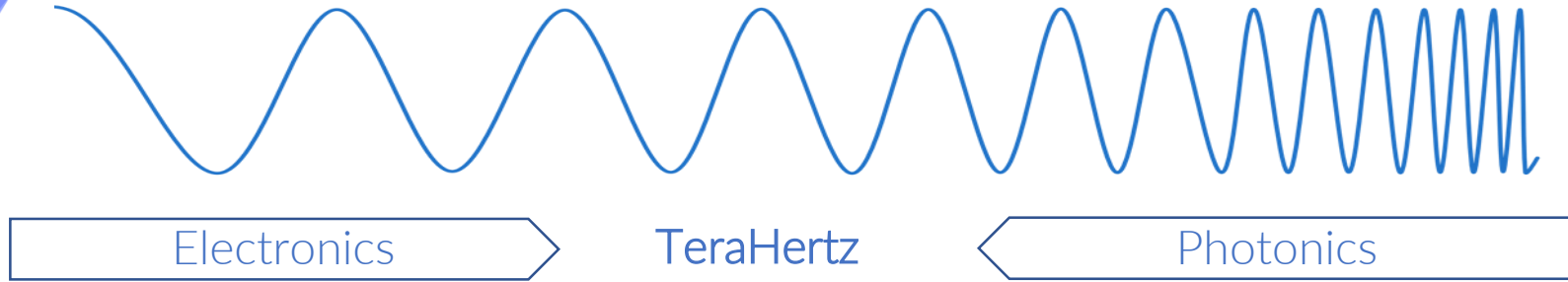
Beam profile
Metal metal



Beam profile
Metal metal integrated
in TC100



The THz gap is closing

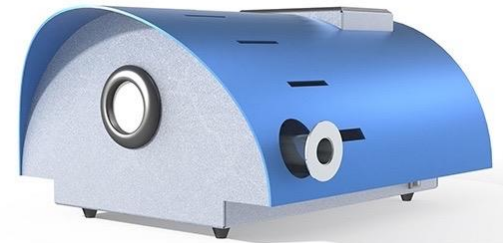


Electronic solid state oscillator
and multipliers



TeraSchottky

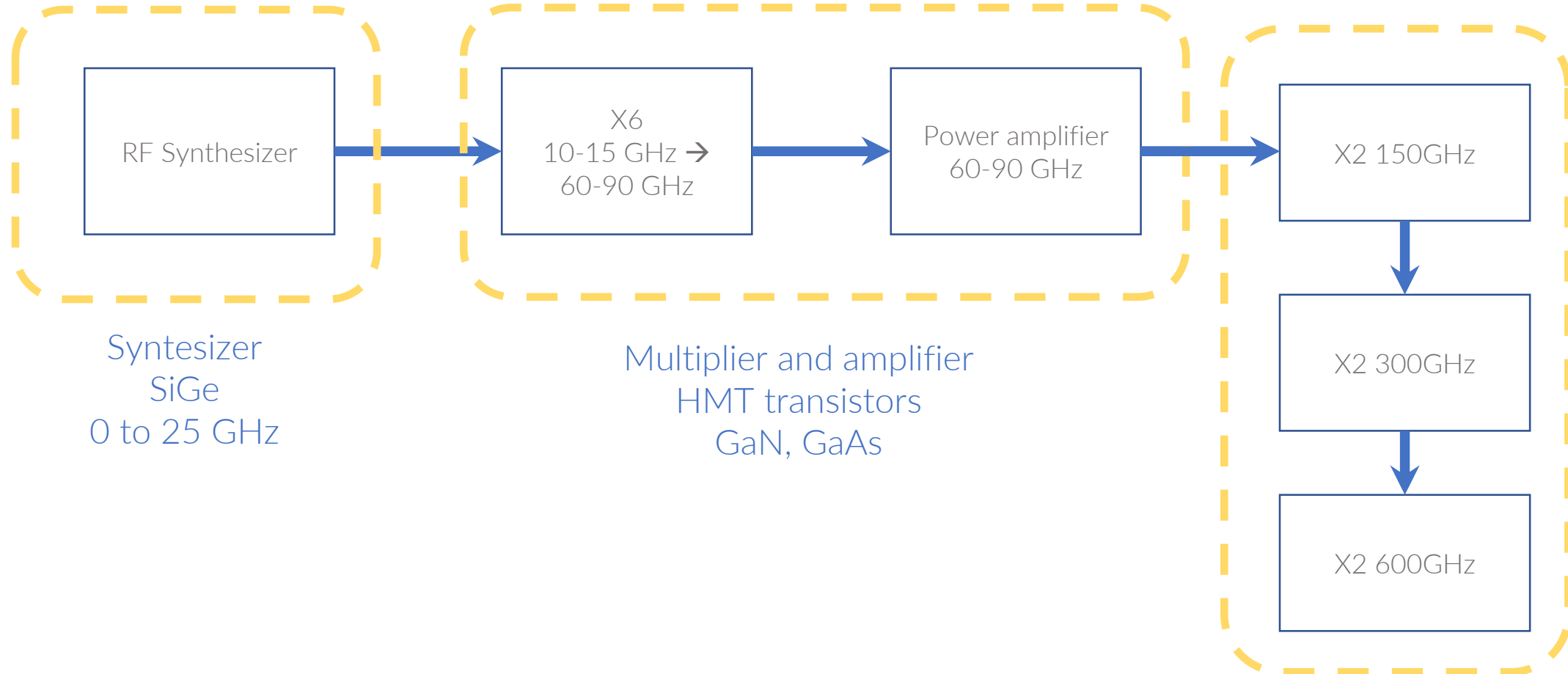
Quantum Cascade Laser



TeraCascade

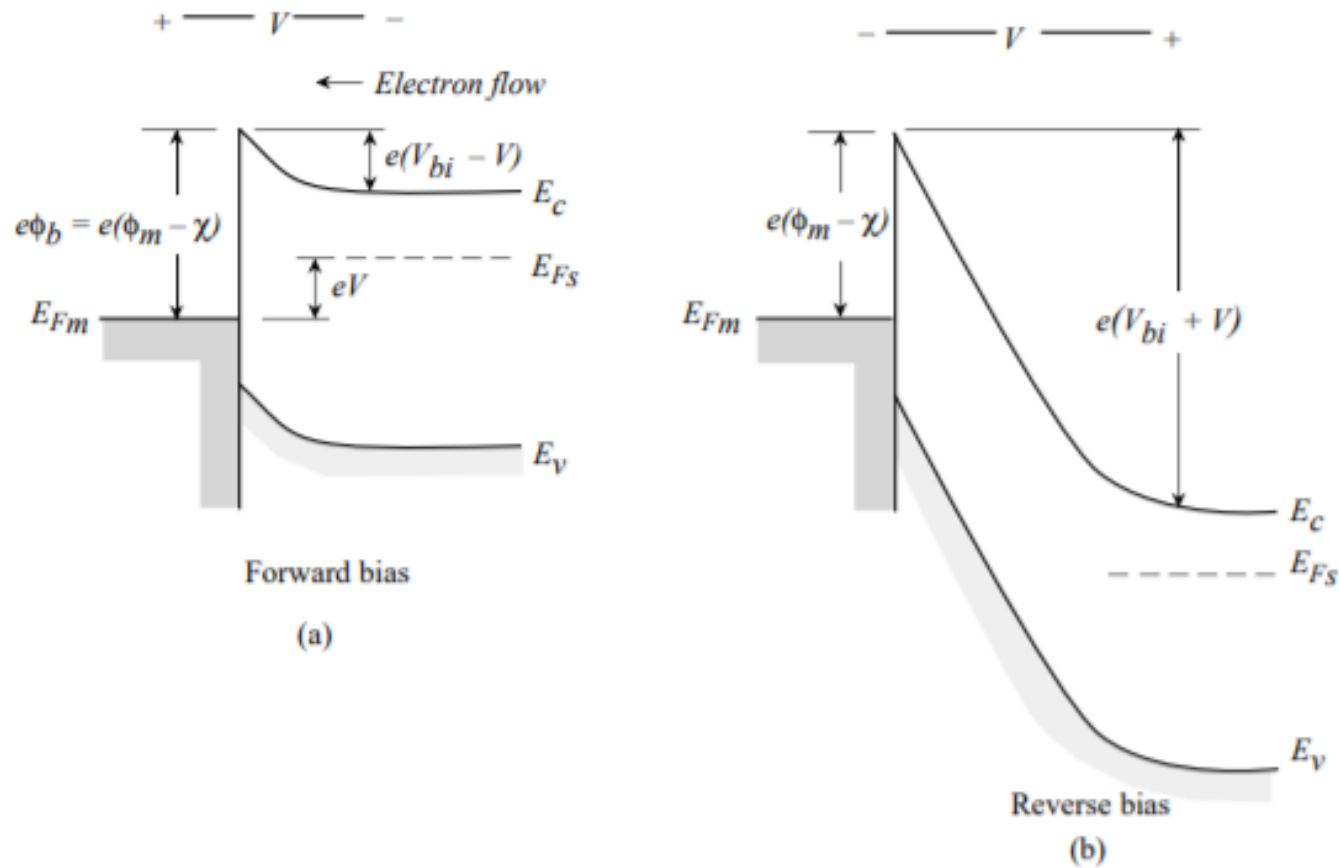
Sub-THz electronic sources

Subsequent multipliers
Schottky diodes technology



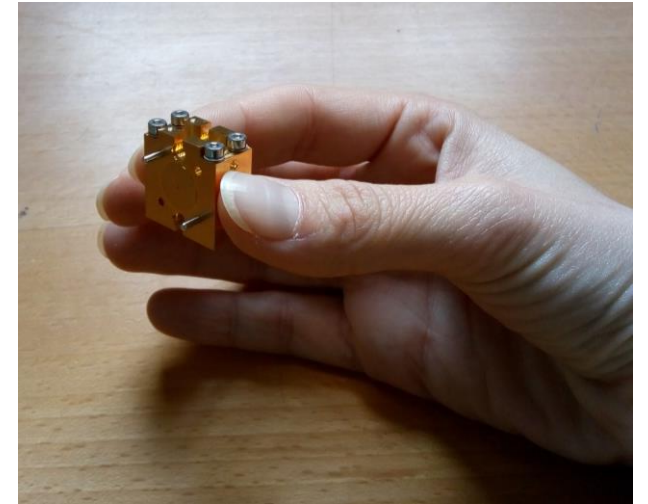
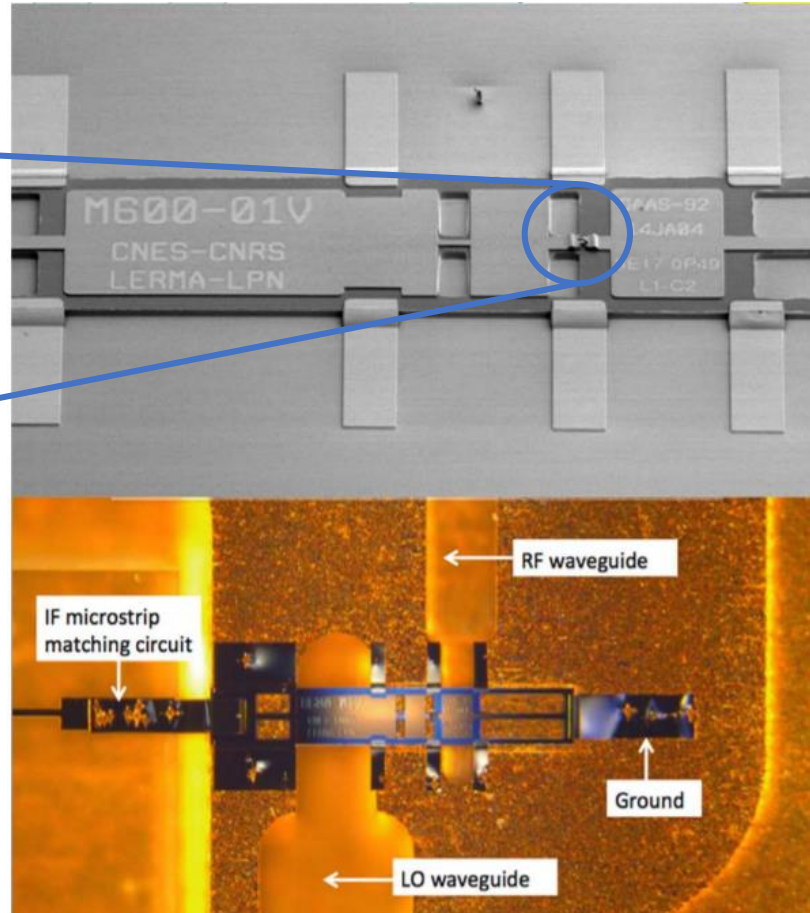
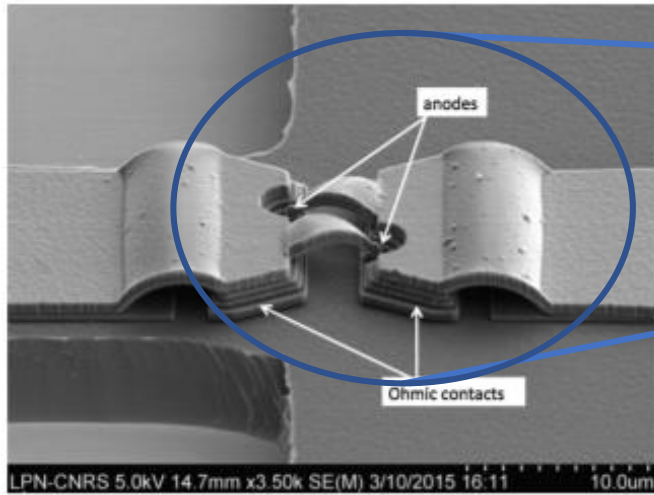
Schottky Diodes for THz technology

Metal-semiconductor junction

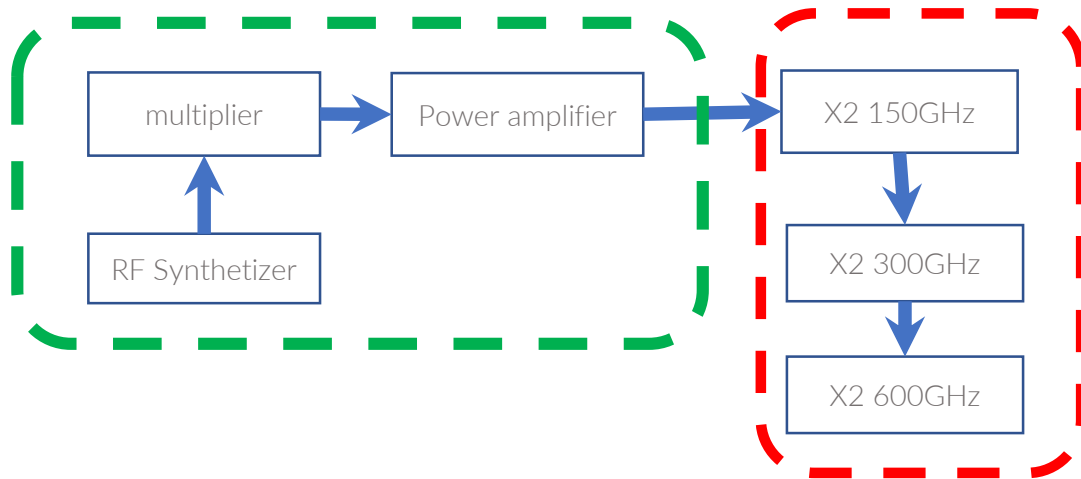


Schottky Diodes for THz technology

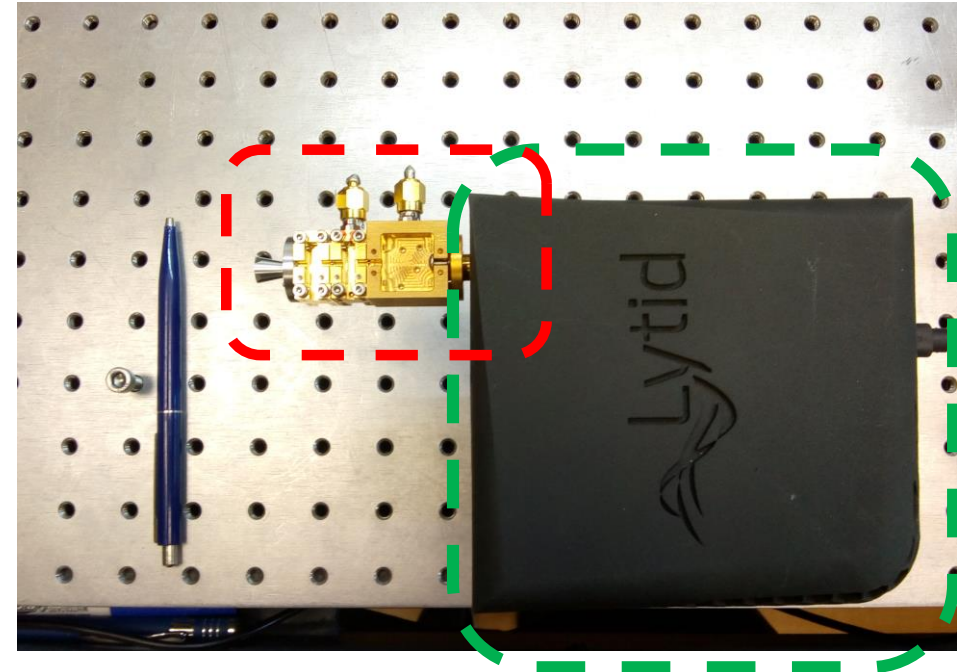
E- beam lithography



Lytid sub-THz source

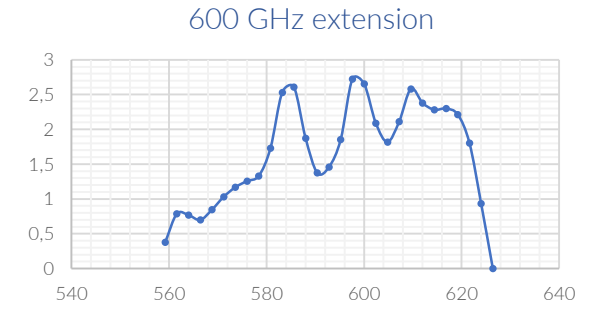
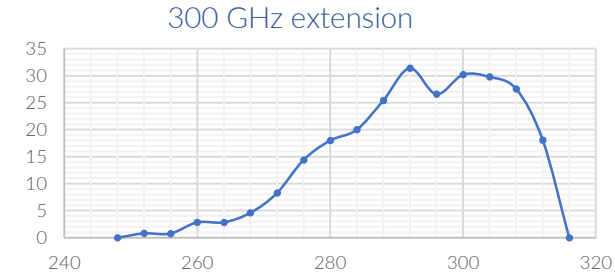
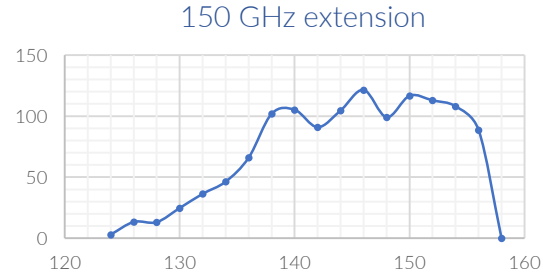
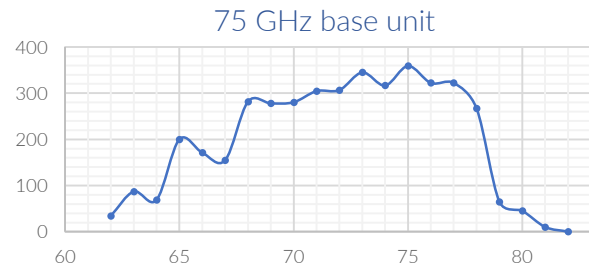



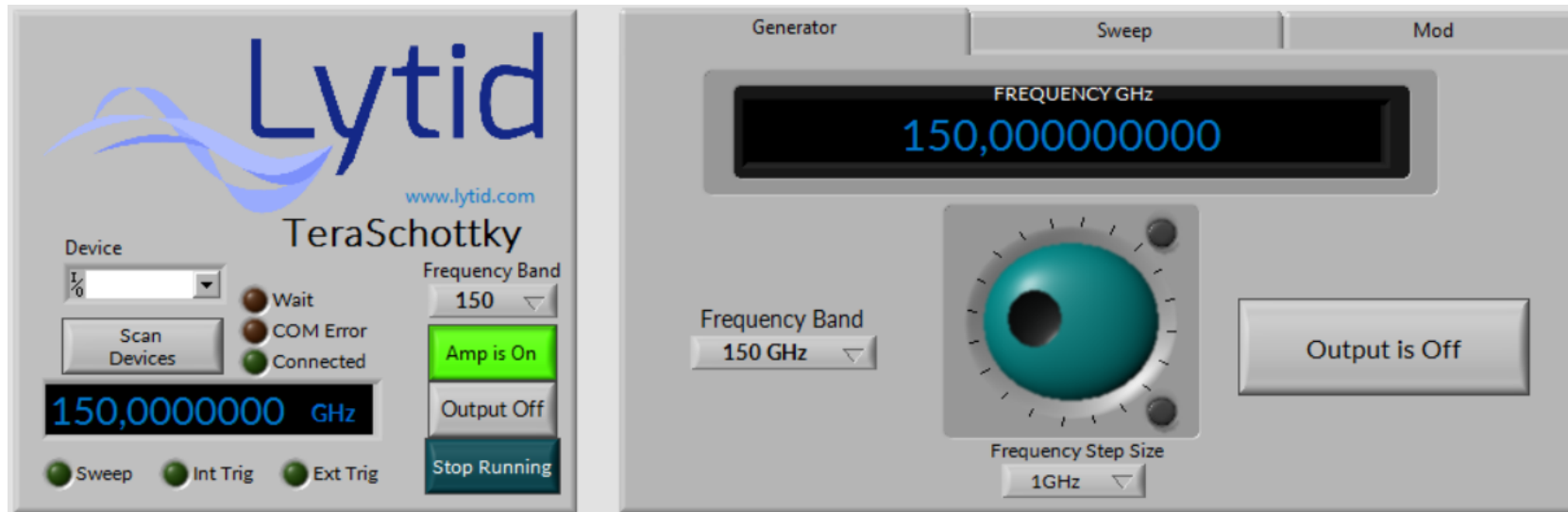
TeraSchottky



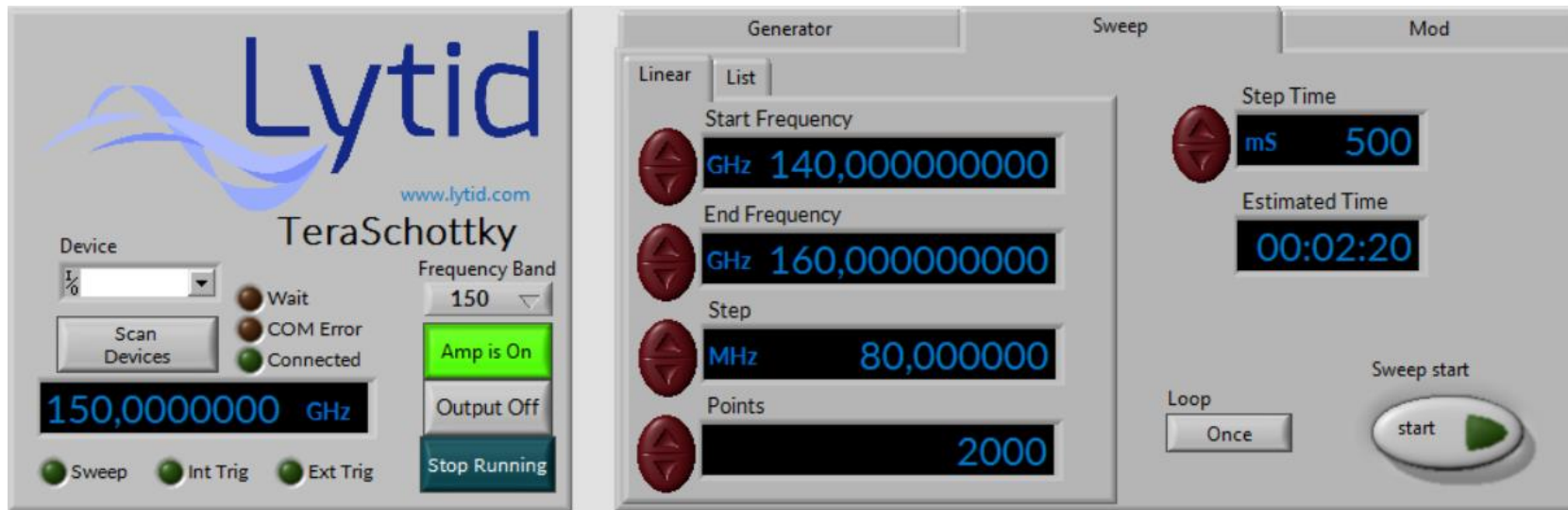
Lytid sub-THz source

Power VS Frequency




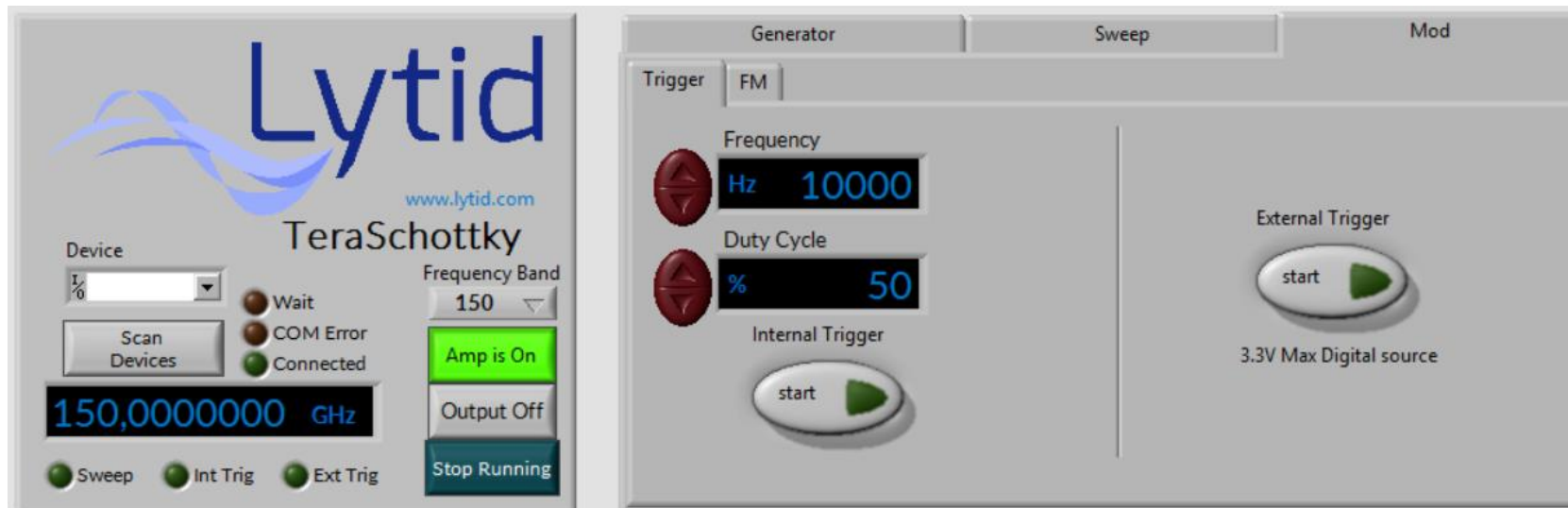
 Lytid sub-THz source

Lytid sub-THz source



The screenshot displays the Lytid TeraSchotky software interface, which is used for configuring a sub-THz source. The interface is divided into several sections:

- Header:** The Lytid logo and the website www.lytid.com are at the top left. The device name "TeraSchotky" is prominently displayed.
- Device Information:** A dropdown menu shows the device as "1/0". Status indicators include "Wait", "COM Error", and "Connected". A "Scan Devices" button is also present.
- Frequency Band:** A dropdown menu is set to "150".
- Current Frequency:** A large digital display shows "150,000000 GHz".
- Control Buttons:** A green "Amp is On" button is active, with "Output Off" and "Stop Running" buttons below it. At the bottom, there are three green indicator lights for "Sweep", "Int Trig", and "Ext Trig".
- Generator Section:** This section is currently selected and shows:
 - Start Frequency: 140,000000000 GHz
 - End Frequency: 160,000000000 GHz
 - Step: 80,000000 MHz
 - Points: 2000
- Sweep Section:** This section is also selected and shows:
 - Step Time: 500 mS
 - Estimated Time: 00:02:20
 - Loop: Set to "Once"
 - A "Sweep start" button with a green play icon.
- Mod Section:** This section is currently inactive.

 Lytid sub-THz source

The screenshot displays the control software for the Lytid TeraSchottky sub-THz source. The interface is divided into two main sections. The left section, titled "Lytid TeraSchottky", includes a "Device" dropdown menu set to "1%", a "Scan Devices" button, and a "Frequency Band" dropdown set to "150". It features three status indicators: "Wait" (red), "COM Error" (red), and "Connected" (green). A large digital display shows "150,000000 GHz". Below this are three buttons: "Amp is On" (green), "Output Off" (white), and "Stop Running" (blue). At the bottom are three indicator lights for "Sweep", "Int Trig", and "Ext Trig". The right section, titled "Generator", "Sweep", and "Mod", has a "Trigger" dropdown set to "FM". It contains two frequency controls: "Frequency" set to "10000 Hz" and "Duty Cycle" set to "50%". Below these are "Internal Trigger" and "External Trigger" sections, each with a "start" button (white with a green play icon). The "External Trigger" section also specifies "3.3V Max Digital source".



Application: Static imaging acquisition

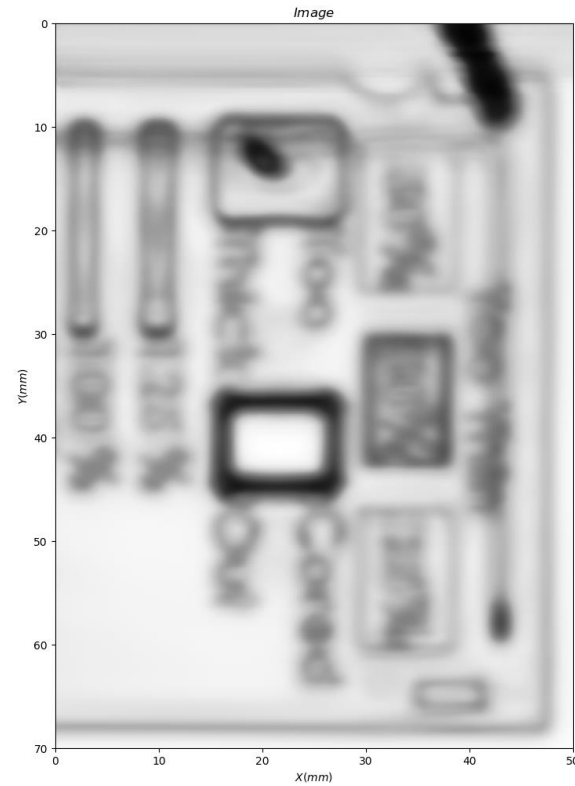
600GHz / 2,5THz PP sample



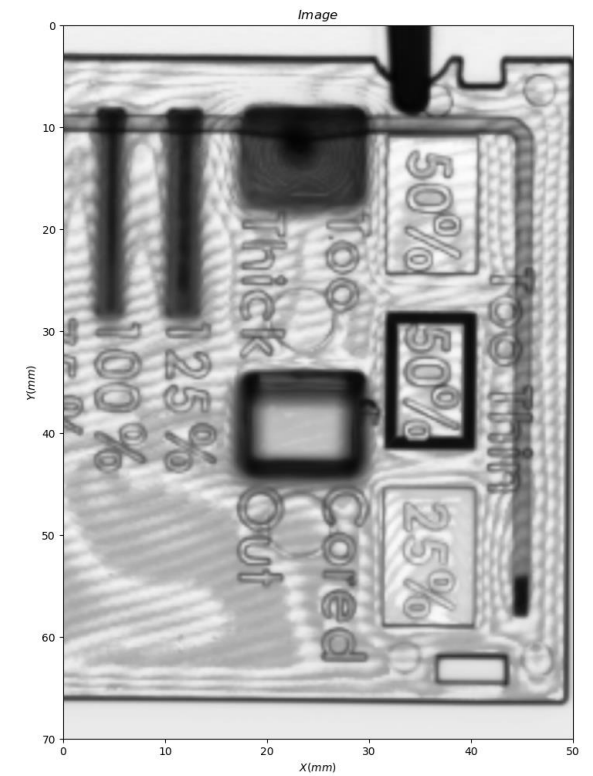
Front Side



Back Side



600GHz

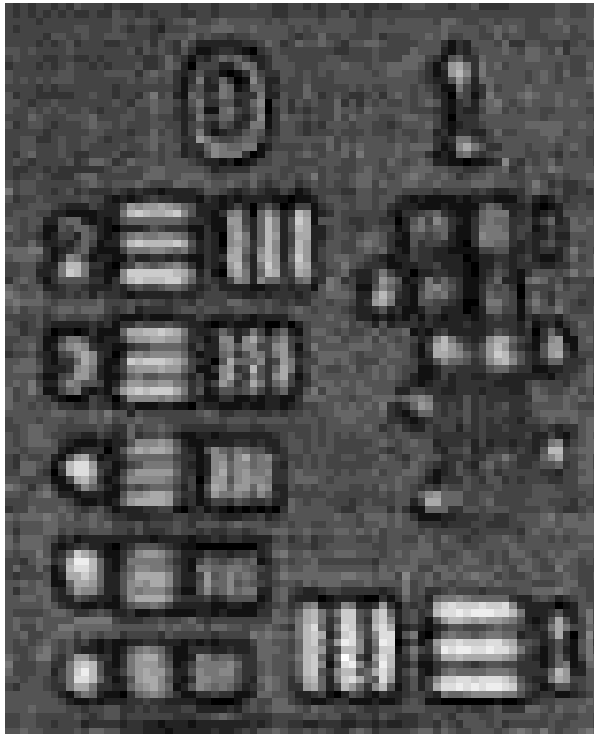


2.5THz



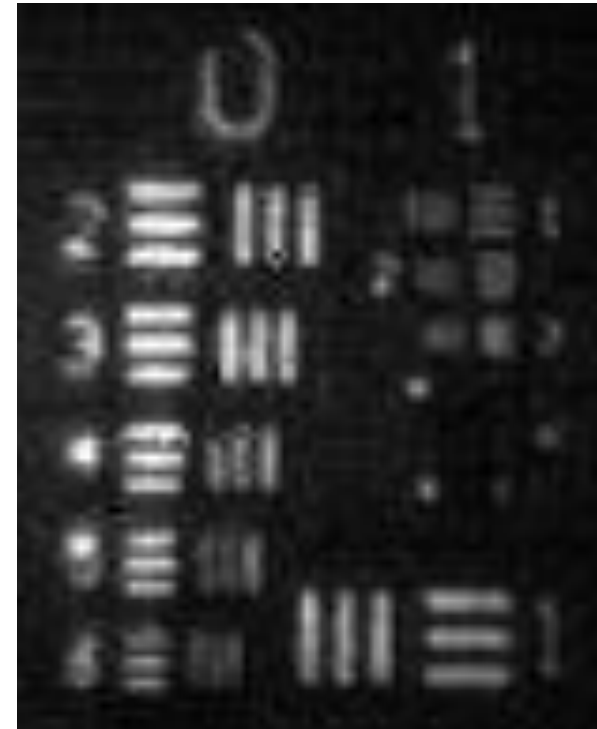
From static to real time imaging

TDS



De quelques minutes
À quelques heures...

TeraCascade + camera



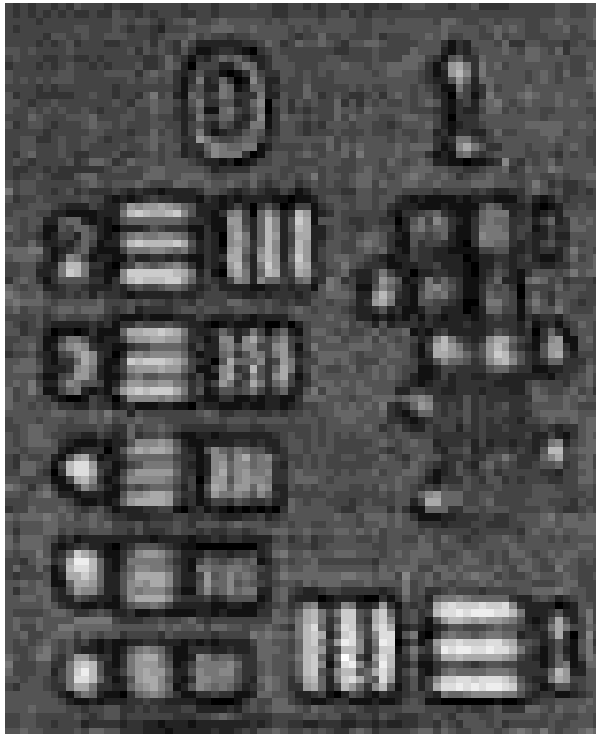
40 ms



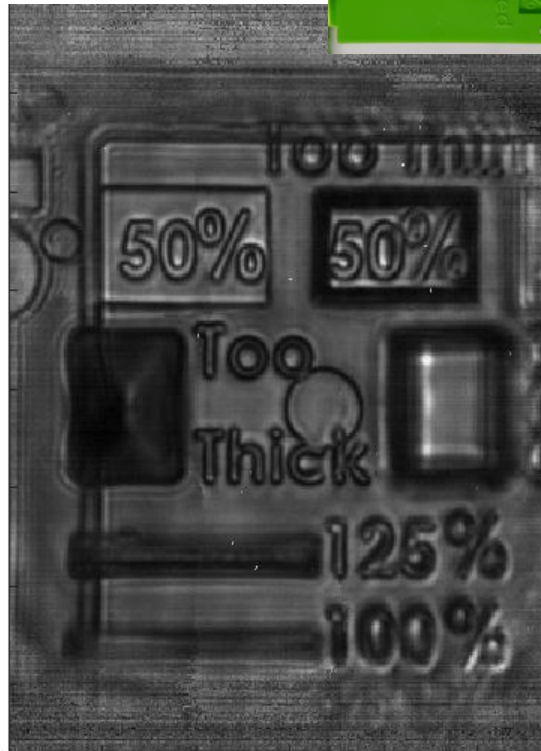


From static to real time imaging

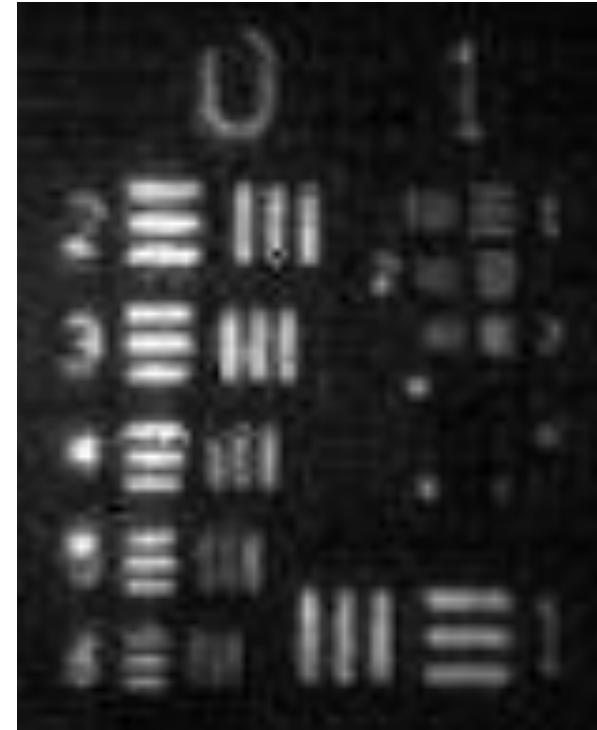
TDS



De quelques minutes
À quelques heures...



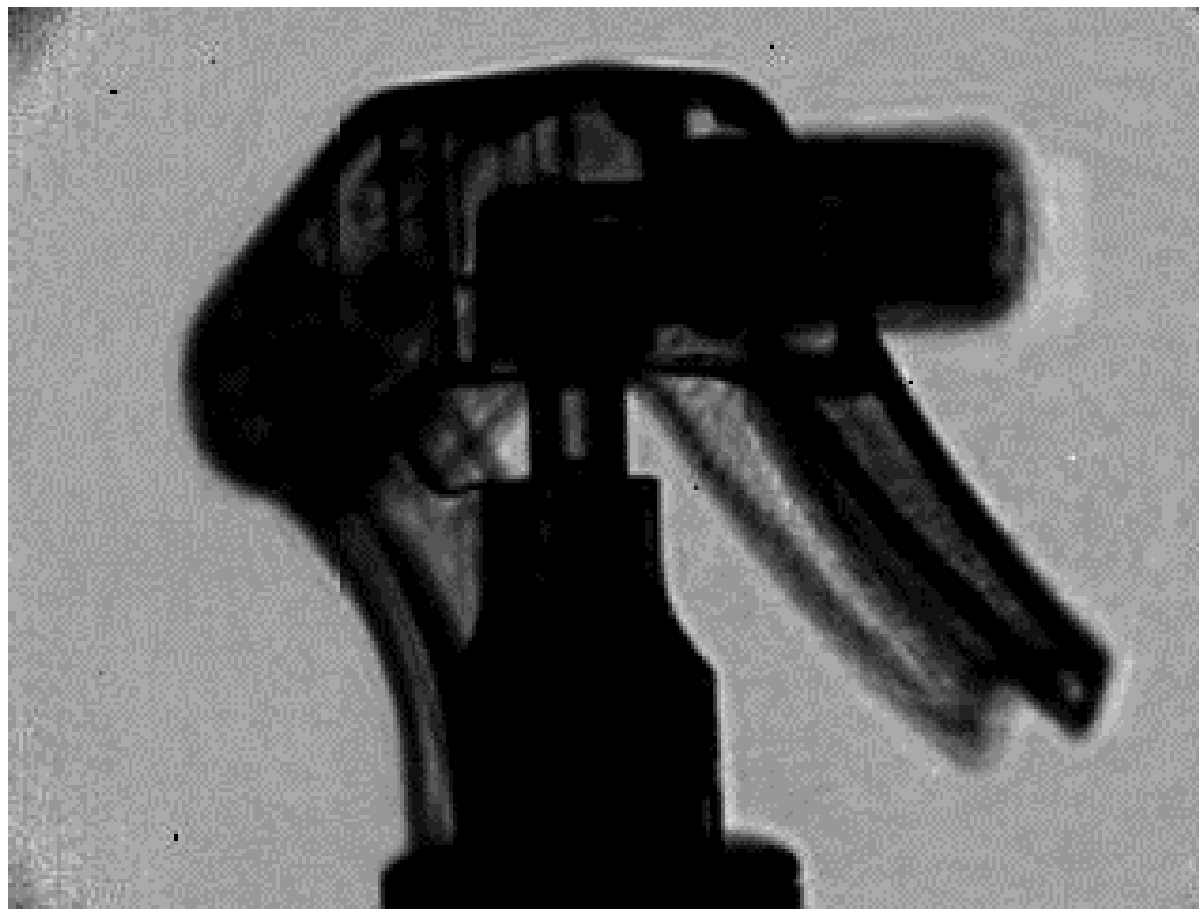
TeraCascade + camera



40 ms



3D reconstruction

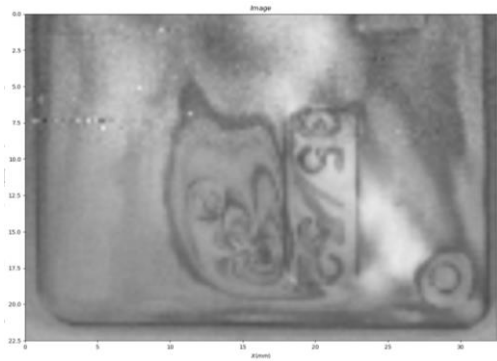


Stress evaluation in opaque materials

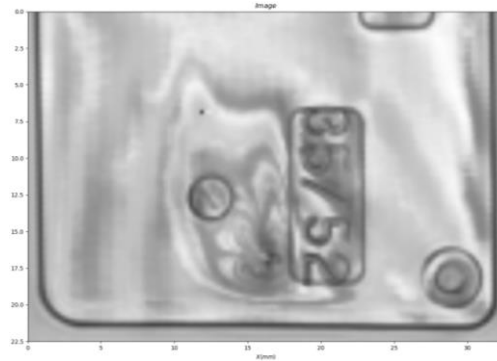
Crossed polarization in transmission



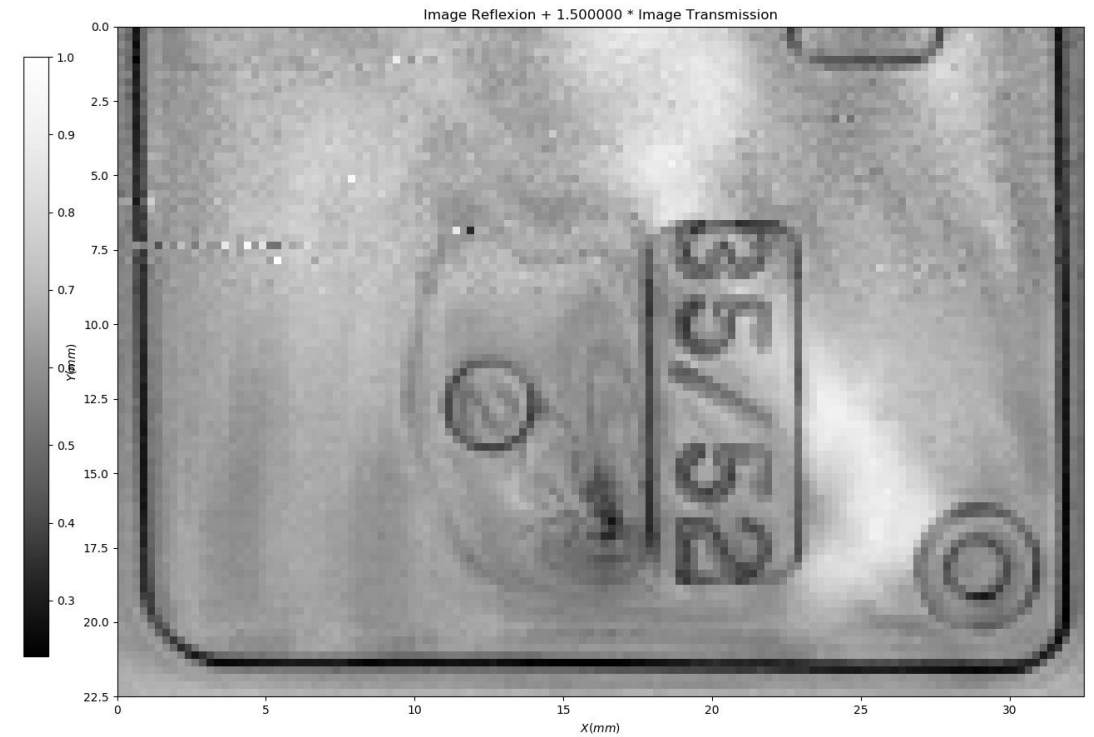
PP sample



Transmission Image



Reflection Image



Combination Image

Still young, playing with big



European
Commission

Horizon 2020
European Union funding
for Research & Innovation

« ...Lytid a des compétences et équipements suffisants en THz... [et] ...constitue un partenaire crédible pour piloter l'exploitation industrielle et commerciale des résultats du projet. »

A new light is coming...

Lytid SAS

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☎ : +33 6 99 37 50 53

www.lytid.com

