PHLUXi

Ex oriente LUX

Electronics

CORE COMPETANCE

We have an advantage in THz-wave technology which was developed by RIKEN Terapho-tonics Research Team. We have considerable experience in solid-state and fiber lasers and their applications. By using this technology we can develop customized products within short deadlines.

MISSION

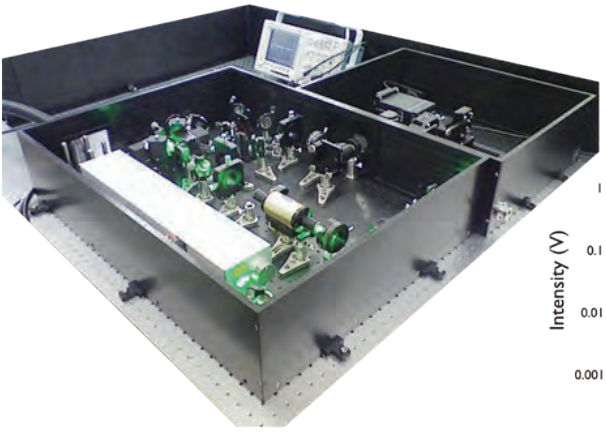
To provide hardware of coherent wave instruments and software including knowledge and experience in these fields for our clients world wide to accelerate R&D and industrial activity.

COMPANY NAME	PHLUXi, Inc.
ADDRESS	1-8-5-2202 Harumi, Chuo-ku, Tokyo 104-0053 Japan (Correspondence) 3-5-25-803 Kamisugi, Aoba-ku, Sendai, Miyagi 980-0011 Japan (Head)
ESTABLISHMENT	October, 2010
CAPITAL	JPY 2,000,000 (as of June 2014)
REPRESENTATIVE	Yoshiharu URATA, D. Eng
DESCRIPTION OF BUSINESS	R&D, manufacture and sale of coherent sources in the region between UV and THz-wave. R&D, manufacture and sale of laser & THz related components, devices, and instruments. Consulting service for above mentioned matters.

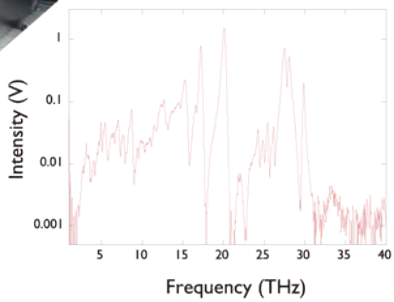
Corporate PROFILE

THz / Laser Instruments

Terahertz Generator using DAST-DFG



Tunable THz-wave can be generated using differential frequency generation (DFG) process in a DAST crystal in 3~30 THz. System includes an optical head, a laser/DFG controller, and a chiller. User can easily select/scan THz frequency through PC control.



Typical tuning curve of DAST-DFG system.

Specifications (preliminary)

Frequency range	3~30 THz
Head dimensions	600 x 500 x 150 mm^3
Power consumption	AC100 V, 5 A

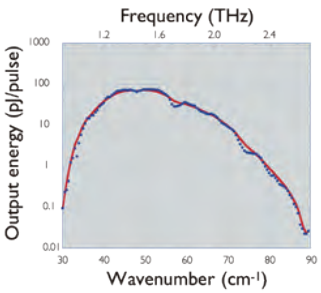
*Pump laser required separately.
** Specifications depend on pump source.

Terahertz Parametric Oscillator (TPO)

Another product in THz range source, TPO. It generates relatively low frequency with smooth and fast tuning from a unique ring resonator. This compact system can include a THz oscillator with a fast tuning mirror, a pump source, and a set of handling optics in an enclosure. All solid-state systems offer stable and reliable output.

Specifications

Frequency range	0.8~2.2 THz
Head dimensions	540 x 400 x 150 mm^3
Power consumption	AC100 V, 20 A



Typical tuning curve of ring TPO.

Laser Engine for Pump Source (PC

Our approach to generate THz-wave requires a source. Employing this laser engine is the best high-power pulses both as an oscillator and as select the mode of operation, the diode power, rod diameter.

Specifications

POD-3/300CS (standard)	
Diode wavelength	808 nm
Diode power	QCW 900 W peak
Laser rod	Nd:YAG, 3 mm-dia
Dimensions	80 x 81 x 86 mm^3

Requirements For Operation

Diode driver capacity	QCW 270 A / 6.6 V
Chiller capacity	200 W at RT

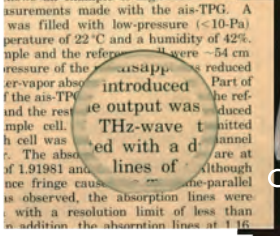
Model Variation

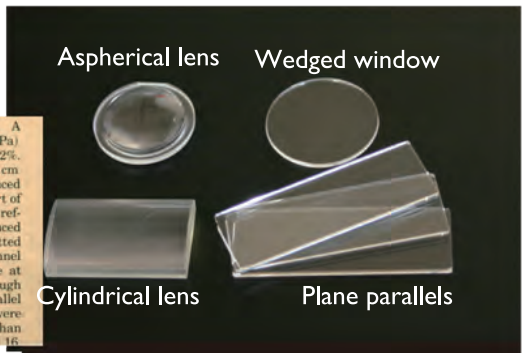
Rod diameter	2.5~5.5 mm
Rod material	YAG, YAP, Vanadates..
Doping	Other activator and concentration
Operation mode	QCW / CW

Passive components

Tsurupica® Optics

Tsurupica® is one of the best transparent material for THz-wave applications. It has much advantages over existing materials such as Polyethylene and Silicon. Tsurupica shows high transmission and low loss on a surface not only for THz-wave but for visible light.



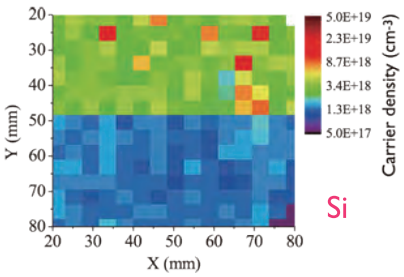


HR-Silicon Optics

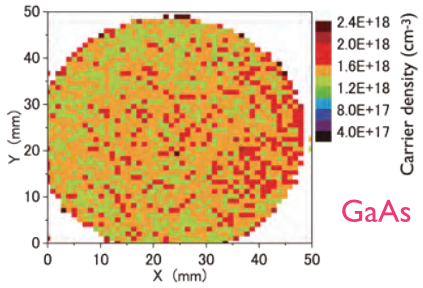
High resistivity Silicon (HR-silico pure material without dopant an contaminations, which is grown using a special technique. It sho considerably lower absorption th normal silicon, especially in low THz frequency region and at resi oxygen-related specific absorptio peak at 1100 cm^{-1}.

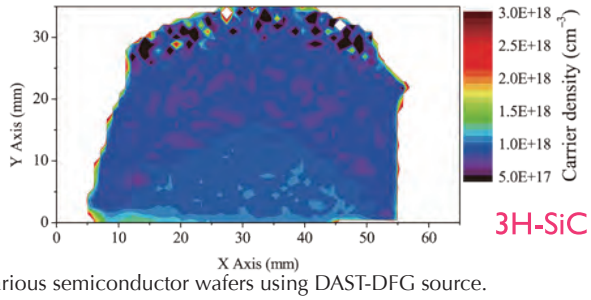
Applications

Semiconductor Inspection: Carrier Density Scanner



The narrow linewidth of DFG-baser THz-wave source and fast switching between on- and off-resonance frequencies enables the non-destructive, high-accuracy measurement of the carrier density of semiconductor with a high throughput. This technique is applicable to Si, Ge, GaAs, SiC, and GaN wafers at present. Measurement is done automatically with a built-in scanner and a unified controller. No vacuum environment is required.

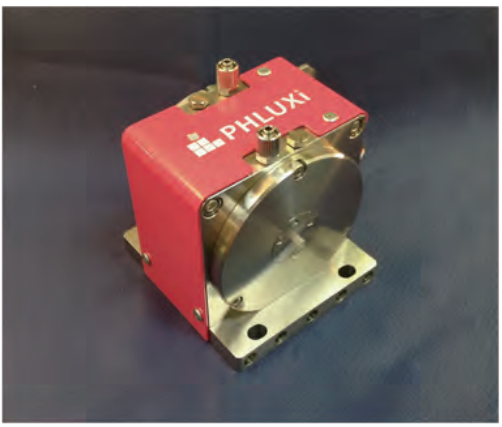




An example of carrier density map of various semiconductor wafers using DAST-DFG source.

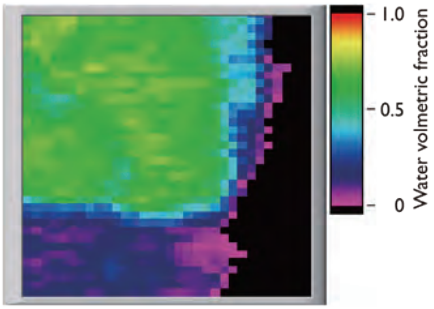
OD)

a powerful laser as a pump
way to achieve high-energy,
an amplifier. Customers can
the laser material, and the

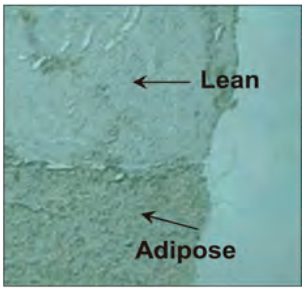


Biological Monochromatic Imaging

THz-wave image is closely related to the water content variation. This makes the THz-wave a viable tool for water measurement.
Tunable THz source can adjust to the frequency to the optimal value for the most reliable analysis. Highly reliable, reproducible water mapping for tiny biological tissue can be achieved without large instruments at a high cost.



THz Image (water content)



CCD Image

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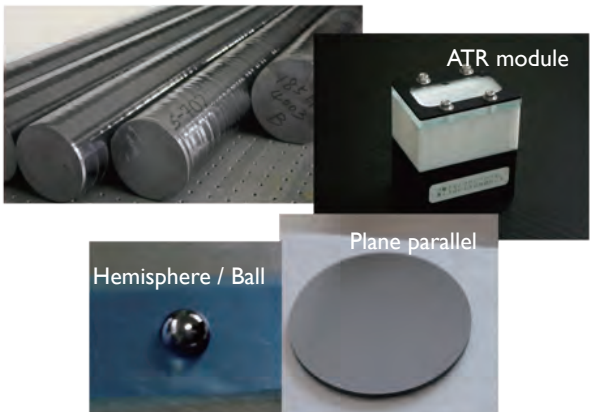
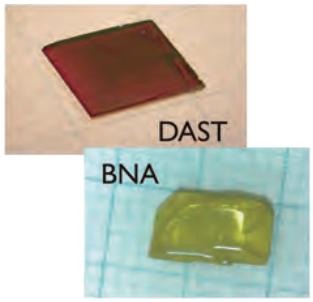


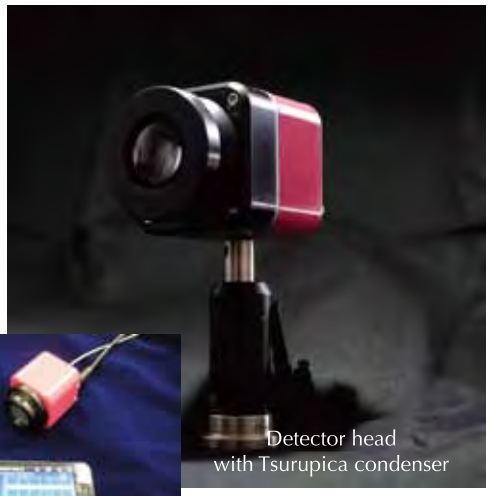
Organic Nonlinear Crystals

High nonliear optical coefficient of organic crystal enables high-efficiency conversion from lightwave to THz-wave. DAST is well-known as one of the best of THz generation materials as it is highly nonlinear coefficient.
A new comer BNA is also exciting material because of its capability of pumping by 1 um source.

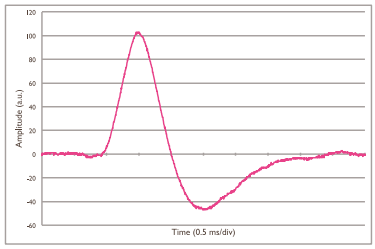


Measuring Instruments

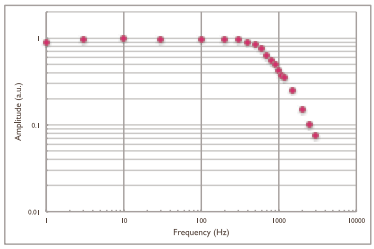
Fast Pyroelectric Detector



Detector head
with Tsurupica condenser



Temporal profile
100 uJ, 100 ns, 1064 nm



Peak amplitude
as a function of pulse repetition rate

Specifications

PYD-1 (standard model)	
Wavelength region	350 nm ~ 300 um
Element surface size	1 mm-dia
Frequency response	300 Hz
Maximum pulsewidth	200 us
Response time	350 us
Sensitivity*1	12 V/uJ
Noise level*2	<1 nJ
Head dimensions*3	54 x 54 x 60 mm^3

*1 For 1064 nm, 100 us pulse
*2 For 1064 nm pulse, battery drive
*3 Without attachment option

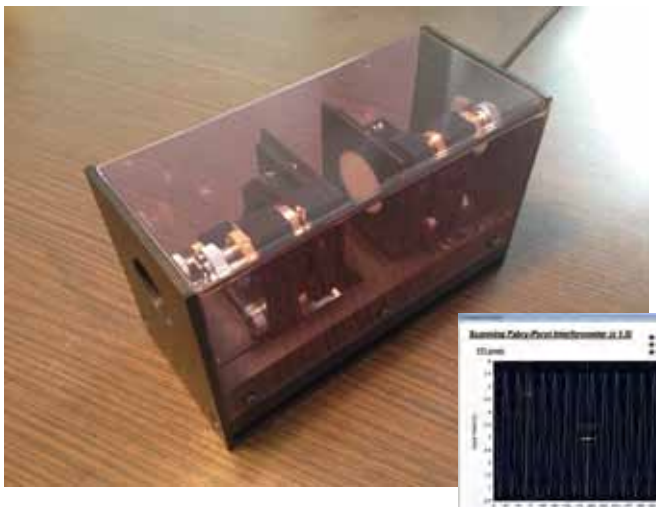
Model Variation

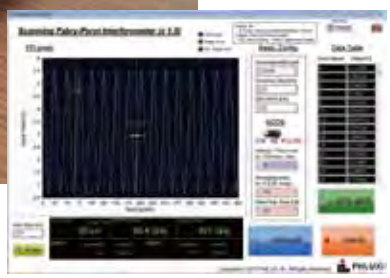
Detector element	low freq / high freq optimized
Amplifier	Battery / Stabilized DC power supply
Beam condenser	Tsurupica lens / Parabolic reflector

Optional Attachments

Tsurupica lens	
Filters	HR-Si, Ge, Polyethylene, Diamond...
Other	Iris aperture, Shutter, Carrying case...

THz Scanning Fabry-Perot Interferometer





Window of measurement software

Specifications

TFPI-1 (standard model with 1 inch aperture)	
Measurable frequency*	0.3 ~ 3 THz
Free spectral range	0.03 ~ 0.6 THz
Resolution	20 GHz
Reflector gap distance	0~12 mm
Gap accuracy	+/- 5 um
Beam height	12 V/uJ
Clear aperture	20 mm
Head dimensions	156 x 97 x 71 mm^3
Head weight	2 kg

System includes; Interferometer head, 1 pair of reflectors, stage controller, and measurement software.
* User selects a pair of specified reflectors for placing order.

Model Variation

Large aperture
Long stage stroke

Option

Additional reflector pair

See separated flyer for each item for detailed information

PHLUXi

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