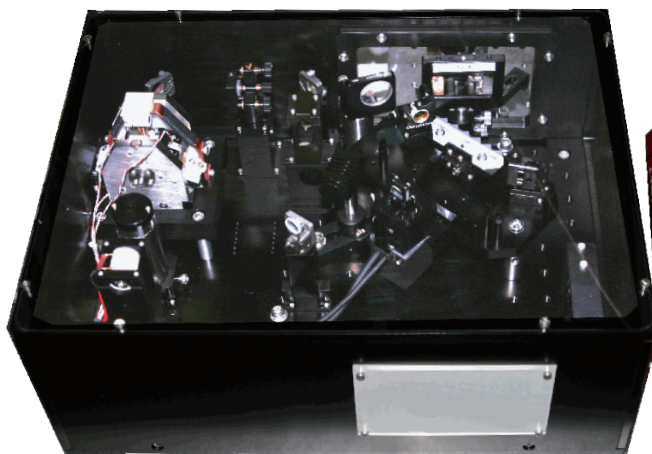


# PHLUXi RTPO

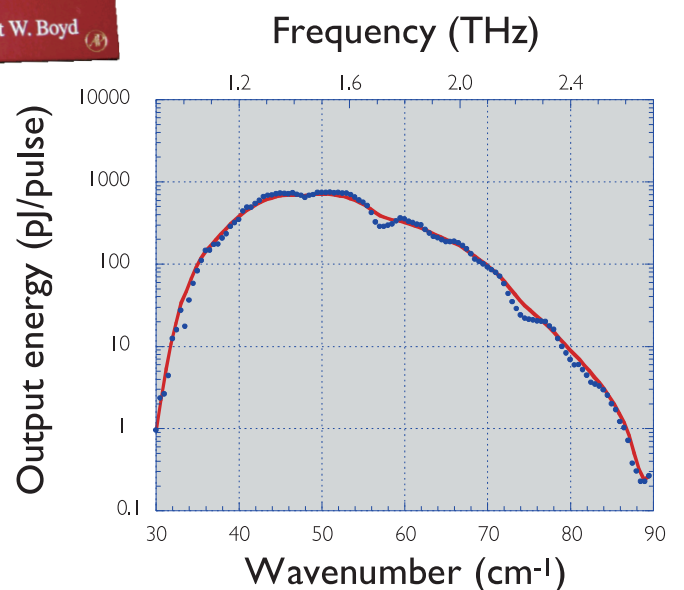
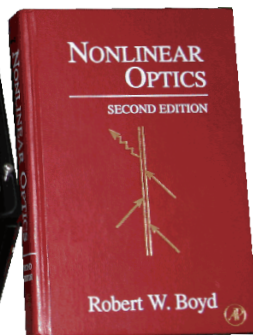
Terahertz-wave Ring Parametric Oscillator RTPO series

## KEY FEATURES

- Wide tunability    Access wide range between 0.7 and 2.2 THz
- Fast scan/tuning    Quick scan by flipping galvo-driven tuning mirror
- High stability    Stable output is realized by unique ring cavity
- Smart package    All solid-state, built-in pump laser also available



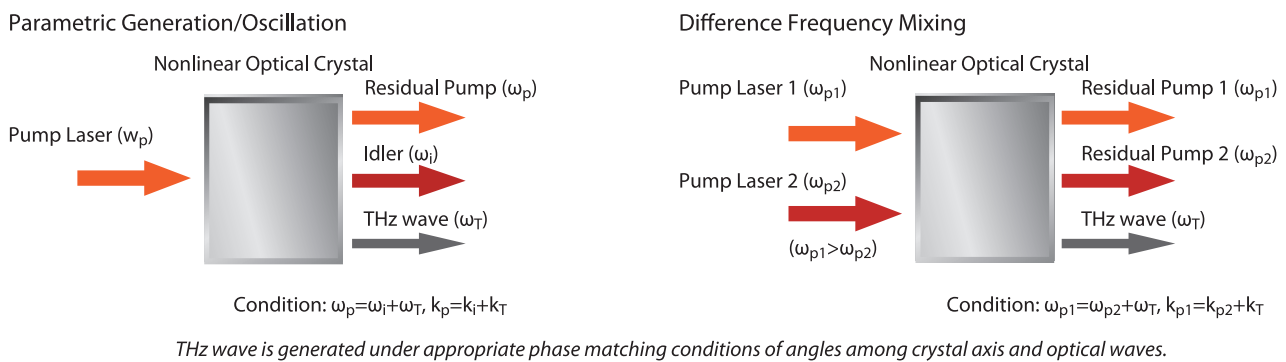
RTPO Head (Minimum Packaging)



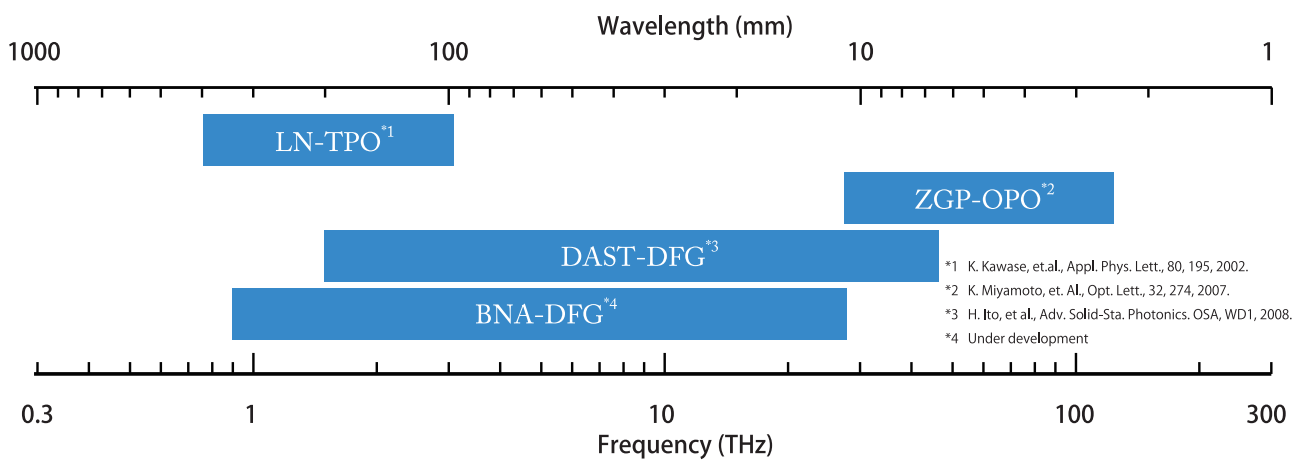
Typical tuning characteristics (requires appropriate adjustment)

## MONOCHROMATIC THz-WAVE SOURCE

The THz Research Teams in RIKEN have successfully invented monochromatic THz wave sources with high-peak power and wide tunability in emission frequency. They create the THz wave emission from the light side by nonlinear wave conversion employing lasers with high power and high coherency. Terahertz parametric generation/oscillation (TPG/TPO) and difference frequency generation (DFG) are applied as nonlinear processes to generate THz wave from short wavelength lasers.



THz wave generation scheme through nonlinear optical conversion process



Variation of broadly tunable THz-wave source

## THz SOURCE OF PHLUXi

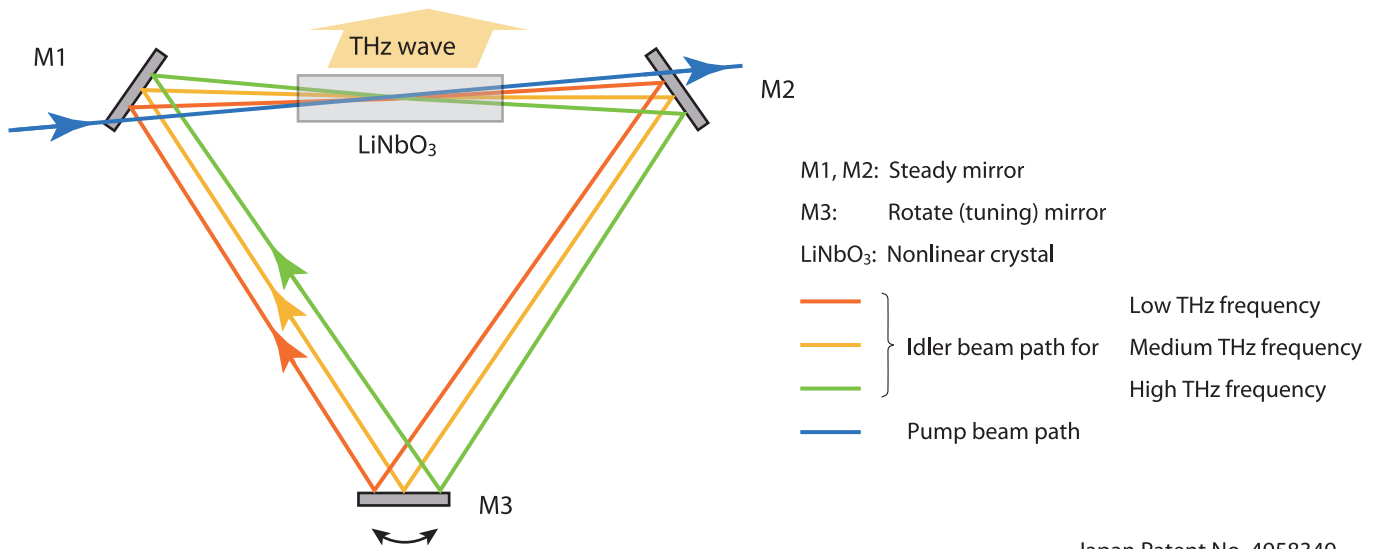
By using cutting-edge research and development from the RIKEN THz teams, stable THz wave sources “ring-cavity TPO” and “DFG source using DAST crystal” have been developed by our own engineering team.

PHLUXi’s THz sources have the following features.

- Monochromatic: Required THz wave emission is provided with a narrow linewidth.
- High power: Efficient conversion from high-peak power pump laser.
- Frequency-tunable: Fast tunability of THz wave with high stability.

## PRINCIPLE OF RING-CAVITY TPO

Applications need a wide tunability range of frequency, quick scan in a small footprint. For a long time, researchers at RIKEN developed various ways to fulfill these requirements. When they invented a ring-cavity parametric oscillator with a scanning mirror, it was a revolutionary perfect answer. Carefully-designed three-mirror-cavity ensures wide tunability between 0.7 and 2.2 THz with a small flipping single mirror.



Scheme of ring-cavity TPO

The above drawing shows a simplified ring-cavity. TPO consists of four elements, mirrors M1~M3 and nonlinear crystal LiNbO<sub>3</sub> (LN). In our appropriately-configured cavity design, idler path definitely keep overlapping with the pump path at a proper position in LN while idler path varied in the cavity as changing angle of M3. Other elements are fixed on the original position. This ensures efficient generation of THz waves through non-collinear phase matching, with fast tuning capability and high stability.

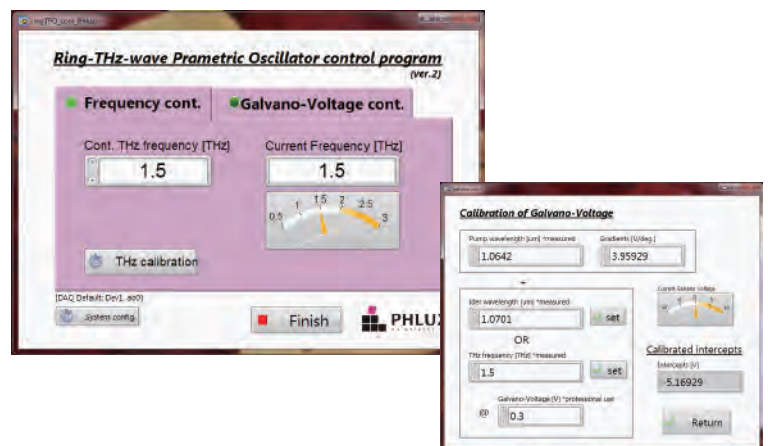
## OPERATION

Fast tuning is achieved using a fast scanning mirror driven by a galvanic actuator. Customer can select their required frequency of THz wave from PC with easy operation, then the PC is quickly set the mirror at the correct position. Frequency on generation is displayed on screen.

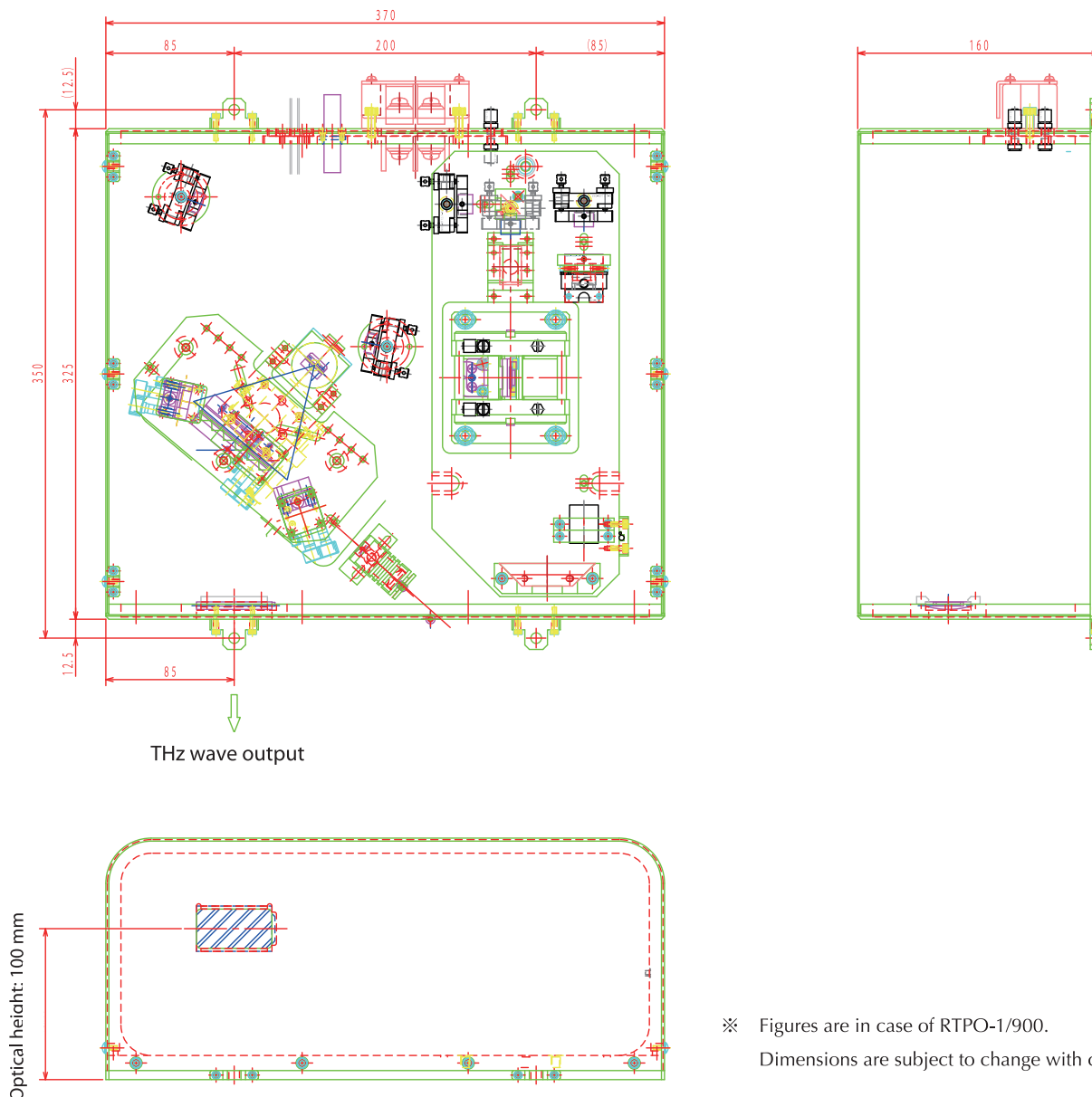
### PC requirements

- OS Windows (XP or later)
- CPU Pentium M >1.0 GHz
- RAM >512 MB
- HDD >10 GB
- USB2.0 port
- Requirements for operating NI\* DAQmx software

\* National Instruments



■ DIMENSIONS (BUILT-IN TYPE)



※ Figures are in case of RTPO-1/900.  
Dimensions are subject to change with configuration.

■ SPECIFICATIONS

Item code	RTPO-X/YYY
Tunable frequency range	0.6~2.2 THz <sup>1)2)</sup>
Maximum pulse energy	>400 pJ/pulse <sup>2)</sup>
Repetition rate	50 Hz <sup>2)</sup>
Pulse width	30 ns <sup>2)</sup>
Maximum scan rate	50 Hz
Power requirement (total)	AC 100V, 25A, 50/60 Hz
Head dimensions <sup>2)</sup>	325 x 370 x 160 mm <sup>3</sup>

- 1) Re-alignment may required for whole tunable range.
- 2) Depends on specifications of pump laser.

Ordering information  
Please specify X and YYY of item code.  
X: 1 for original, 2 for advanced  
YYY: Peak power of pump diode  
- Single module YAG: 900  
- Twin module YAG: 1.8K  
We can also offer pump-less system.

RTPO system consists of TPO Head, Pump laser, Laser power supply, Water chiller, Galvanic scanner driver, and peripherals which required for operation.



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