T-Spin2X

TeraSpinTec

Large-area Ultrabroadband Terahertz Emitter

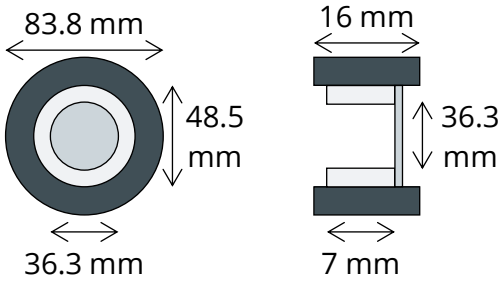
www.teraspintec.com

Overview

The spintronic terahertz (THz) emitter is based on an optimized metallic thin-film stack that includes spintronic materials. Upon illumination by a femtosecond pump pulse, a terahertz pulse is generated. The THz band-width covers frequencies from 0.1 up to 30 THz without any spectral gaps[1]. The emitter is fully passive including an integrated magnet design that allows easy and full control over the linear terahertz polarization. **Optimized for 800 nm excitation.**

T-Spin2X

Dimensions

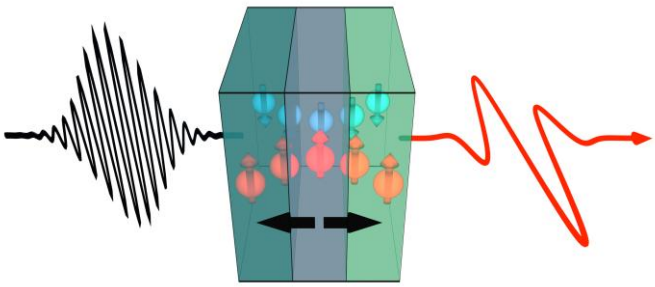


Key Benefits

- **Ultrabroadband THz generation** without spectral gaps
- **Large area emitter** for increased pump pulse energies
- **High THz-generation efficiency**
- **Fully passive operation**
- **Integrated magnet** that allows full and easy 360° control of the linear THz polarization
- **Long term stability**
- **THz beam parameters are inherited** from the pump beam
- High efficiency for **many pump wavelengths** from the mid-infrared to X-rays
- **Reflection and transmission** geometry possible: A THz pulse is emitted in forward and backward direction simultaneously
- **Collinearity of pump and THz beam** allows for easy implementation and straightforward alignment of your THz spectrometer

Applications

- Ultrabroadband linear THz spectroscopy
- Upscaling enables nonlinear THz spectroscopy
- THz near-field microscopy
- THz scanning tunneling microscopy
- X-ray timing and pulse-shape monitor
- Ultrafast photodetector (THz pulse determined by pump pulse envelope)



[1] The actual terahertz band-width depends on the pump pulse duration and may vary depending on specific experimental conditions.

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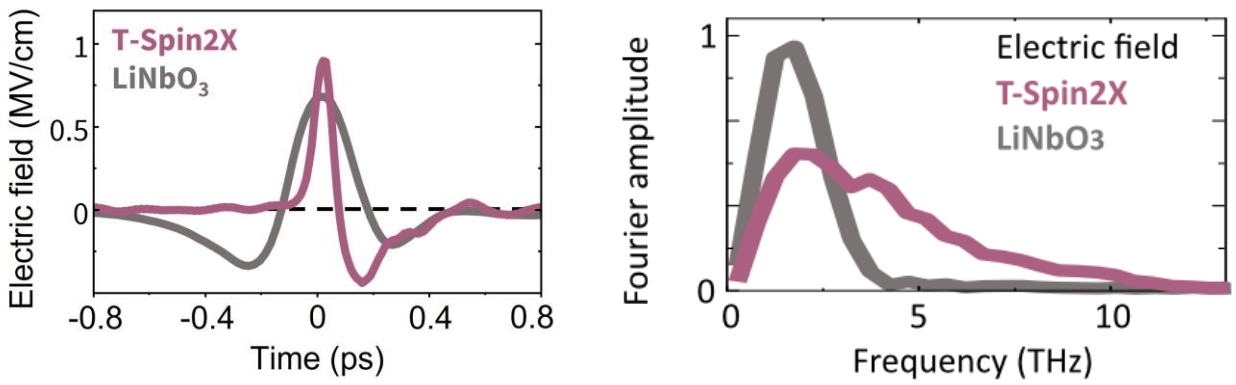
Technical Data

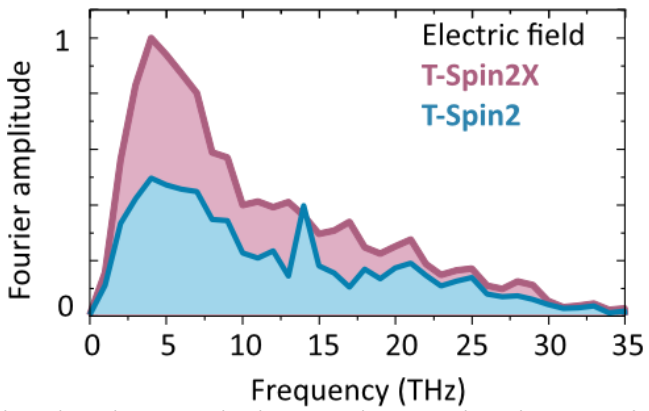
T-Spin2X	
THz band-width[1,2,3]	0.1 – 30 THz @ 15 fs pump pulse duration
THz electric-field strength[2,4]	>600 kV/cm
Ideal excitation conditions	Focused or collimated beam (diameter up to 34 mm), **optimized for 800 nm excitation**
Max. excitation fluence[2]	0.5 mJ/cm^2
Rotation mount	M4 thread at the bottom (post not included), identical to RSP2/M from *Thorlabs, Inc.*
Magnet	Outer diameter 50.8 mm, inner diameter 36.3 mm, thickness 7 mm
Spintronic THz emitter	Diameter 50.8 mm, thickness 0.5 mm

Exemplary Measurement Data[1,2]

T-Spin2X comparison to $LiNbO_3$ under comparable excitation conditions[4]



T-Spin2X comparison to T-Spin2 under comparable excitation conditions[3]



[1] The actual terahertz band-width depends on the pump pulse duration and may vary depending on specific experimental conditions. The THz band width approximately scales inversely proportional to the pump pulse duration.
[2] Typical values only. Actual values may vary depending on specific experimental conditions.
[3] Obtained with 15 fs pump pulses centered at a wavelength of 785 nm, 80 MHz repetition rate, 80 mW excitation power, about 0.5 mJ/cm^2 excitation fluence.
[4] Obtained with 45 fs pump pulses centered at a wavelength of 800 nm, 1 kHz repetition rate, 5 W excitation power, about 0.5 mJ/cm^2 excitation fluence.

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