

Laser Frequency Conversion Devices

HarmoniXX Series

HarmoniXX series products are frequency converters for ultrafast lasers. It is an ideal choice for Ti: Sapphire lasers, oscillators and OPOs, covering second harmonic generation (SHG), third harmonic generation (THG) and fourth harmonic generation (FHG). It can reach the visible and near-infrared range, and the depth of ultraviolet is as low as 190 nm.

Main advantages:

- ◆ Generation of second, third and fourth harmonics
- ◆ Remote operation through software GUI
- ◆ Suitable for tunable and fixed frequency fs and ps lasers
- ◆ Easy alignment and automatic wavelength tuning



Second Harmonic Generation (SHG)

As a part of our HarmoniXX series products, HarmoniXX SHG is a frequency converter that can be used for frequency doubling of ultrashort pulse lasers. It is a kind of nonlinear process. Because it is well combined with photons of the same frequency as nonlinear materials, new photons with twice the energy are generated. Therefore, SHG is twice the initial photon frequency and half of the wavelength.

Third Harmonic Generation (THG)

As part of our HarmoniXX series products, HarmoniXX THG is a frequency conversion device that can increase the frequency of ultrashort pulse laser to 3 times. Due to the use of three photons, a single photon is generated at a frequency of three times. It is a generation with three times the frequency of photons. Different from the traditional triplet, THG needs a small amount of adjustment work, because it does not need separation and reorganization

Parameters	HarmoniXX SHG	HarmoniXX THG
Input wavelength range	< 420 ... > 2000 nm (One set of optical device corresponds to one range; e.g. 660 – 1320 nm)	680 ... > 2000 nm (One set of optical devices corresponds to one range; e.g. 650 – 1300 nm)
Output double frequency	< 210 ... > 1000 nm (e.g. 340 ... 540 nm for TiSa)	Low to < 230 nm (e.g. 227 ... 360 nm for TiSa)
Output fundamental frequency light	allowed	allowed
Spectral bandwidth	Depend on optical kit: kit 1: 13 ... 65 nm, kit 2: 5 ... 15 nm	allowed
Pulse width	fs or ps	fs or ps
Conversion efficiency	E.g. 40 % at 130 fs; e.g. 15 % at 2 ps	THG 10 % (fs), 3 % (ps)*, SHG 20 % (fs), 10 % (ps)*; *depend on laser model/pulse width
walk-off compensation	Built-in mechanical walk-off compensation	Built-in mechanical walk-off compensation
State of polarization (linear)	Input: horizontal, SHG output: vertical, fundamental light output: horizontal	Input: horizontal, THG output: horizontal, SHG output: vertical, fundamental frequency light output: vertical
automation	Fully electric, including GUI/software, automatic power adjustment optional	Fully electric, including GUI/software, automatic power adjustment optional
Optional configuration		
Automatic power adjustment	Press the button to automatically optimize the output power	Press the button to automatically optimize the output power