Genia Photonics

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Genia Photonics' technology is based on an innovative picosecond pulsed fiber laser design that enables unprecedented flexibility. Its unique solution provides for unequalled capabilities in a single laser:

- Programmable and electronically controlled
- Linear scans in optical frequencies or wavelengths
- Randomly accessible wavelengths
- Capable of high speed sweeps, up to 1024 wavelengths
- Adjustable pulse width in the picosecond regime
- Adjustable repetition rate
- Adjustable output power

Other advantages make it

- Briefcase size
- Modular
- Reliable (no moving parts, telecom parts)
- Low cost

Genia Photonics standard products fits various applications in the life sciences, industrial and defines & security sectors and can be categorized into 2 families of products

- **TLA Series Laser** – Using a utility software provided with the laser, the TLA series of lasers offers the possibility to program any of the laser parameters. The TLA series of lasers is available with a wavelength tunability and sweep function configuration. The sweep function allow an ultra fast wavelength change and allows the user to control the sweep sequences. For instance one can chose a linear in optical frequency sweep and specify the start frequency, the stop frequency and the step duration.
- **FSA Series Laser** – The FSA Series of lasers offers short picosecond pulses at various repetition rates with the added benefit of synchronization. All parameters are configurable through a simple and intuitive user interface running off a PC. The FSA series laser sources can run off their own internal clock or sync off an external clock from another laser source such as a Ti:Sapphire laser. This feature makes it highly desirable for non-linear spectroscopic applications including coherent anti-Stokes Raman scattering (CARS) or Frequency Modulated CARS (FM-CARS) and with the dithering option, stimulated Raman scattering (SRS) spectroscopy which are advanced spectroscopic techniques providing a higher sensitivity than the actual Raman spectroscopy.

Picosecond Programmable Laser

Genia Photonics' laser is a fully programmable, uniquely agile fiber laser, tunable in wavelength, pulse width, repetition rate and power.

Using a utility software provided with the laser, you can program any of the laser parameters. The Picosecond programmable laser is available in its tunable or tunable and sweepable configuration. The sweepable version allow an ultra fast wavelength change and allows the user to control the sweep sequences. For instance one can chose a linear in optical frequency sweep and specify the start frequency, the stop frequency and the step duration.

Wavelength availability ranges from 1.0 um, 1,3 um or 1.5 um as standard products but Genia Photonics' laser technology platform for Picosecond Programmable Lasers permits to explore other wavelengths that are less commonly used.

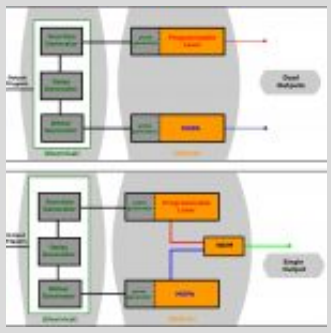
FSA Series – Pulsed Fiber-based Synchronization Lasers

The FSA series offers short picosecond pulses at various repetition rates with the added benefit of synchronization. Its fiber-based design and interfaces offer advantages such as stability and flexibility with ease in set up and alignment. All the laser's parameters are controlled from a PC through a GUI.

The FSA series laser sources can run off their own internal clock or sync off an external clock that can either be electrically supplied or derived from an optical pulse stream from another laser source such as a Ti:Sapphire laser. Electrical trigger signals including signal delay management for triggering data acquisition systems are also available.

High Wavenumber Synchronized Picosecond Programmable Laser

Genia Photonics' Picosecond High Wavenumber Synchronized Programmable Laser incorporates a tunable programmable laser and a MOPA into a single source with both output synchronized to the target. Covering the raman shift range from 2815 cm-1 to 3350 cm-1, this compact fiber laser is ideal for applications that deploy nonlinear spectroscopy techniques such as Coherent Anti-stokes Raman Scattering (CARS) and Stimulated Raman Scattering (SRS). This laser is designed for translational research work in the biomedical field especially toward clinical applications.



MOPA

The MOPA (Master Oscillator Power-Amplifier) fiber laser/amplifier architecture is used to amplify the output of a seed laser to higher power. The seed incorporated in our MOPA can be configured by the user with different pulse widths and repetition rates according to the desired application. The energy and output power are also user-controlled.

Genia Photonics MOPA fiber laser can be used in conjunction with the programmable laser as part of a synchronized laser system. Moreover, it is available as a tunable MOPA fiber laser with all its parameters (wavelength, pulse width, repetition rate) configurable via the graphical user interface. Polarization Maintaining (PM) and Randomly Polarized MOPA lasers are available to suit many different applications from laboratory research to field deployment.

The Tunable MOPA fiber laser can be used as slave or master while being synchronized with a Ti:Sa laser.

Wavelength availability ranges from 850 nm, 10xx nm, C or L-band or Second Harmonic Generation (SHG) with 532 nm, 765 nm or 792.5 nm.

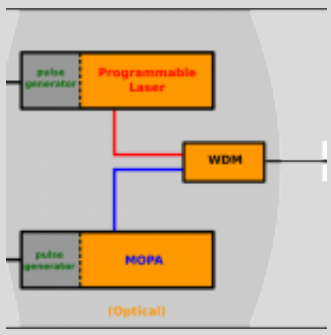
Picosecond Tunable 1 um MOPA Laser

Genia Photonics' tunable 1 µm MOPA laser is a pulsed fiber-based laser with full wavelength tunability from 1030 nm to 1080 nm. This laser offers high peak power at variable repetition rates and can also be synchronized with Ti:Sa lasers for applications such as Coherent Anti-Stokes Raman Scattering (CARS). The advanced electronics and software provide the additional benefits of complete control of all parameters via a Graphical User Interface (GUI) from a PC.

This compact laser fits well in research laboratories for many types of applications especially nonlinear optics and biomedical applications including multimodal nonlinear research.

Picosecond Tunable Mid-IR Laser

Genia Photonics' tunable mid-IR fiber lasers deliver wavelengths in the Mid-IR, covering multiple ranges. Genia Photonics' core technology platform enables the generation of a widely tunable laser light without a mid-IR laser cavity covering a large wavenumber range from the fingerprint region to the high wavenumber region.



As various chemical substances exhibit absorption peaks in the mid-IR spectral range, the fast tuning capability of Genia Photonics' laser enables rapid detection of such substances over a wide spectrum. One of the key advantages is the capability to bring the mid-IR light to the sample with a standard single mode fiber, allowing detection at remote distances.

TLA Series – Tunable Pulsed Fiber-Based Lasers

The TLA series of tunable pulsed fiber-based lasers offers rapid wavelength tunability over a wide range. All control parameters can be easily programmed including the many configurable modes of the wavelength sweep function. Setting all the laser parameters can be done simply with a click through a PC Graphical User Interface (GUI). External electrical timing signals for triggering data acquisition systems or other devices are also available and easily controlled from the GUI.

The TLA series also offers a sweep function that enables rapid wavelength sweeping in either a sequential mode or in arbitrary user defined sequences and patterns. Its fiber-based design offers all the advantages of optical fiber for flexibility, stability and robustness.

Picosecond Synchronized Programmable Laser

The Picosecond Synchronized Programmable Laser platform incorporates the technological innovative Programmable Laser and the Picosecond Master Oscillator Power Amplifier (MOPA) laser into a one small footprint unit that delivers a single combined and synchronized dual-wavelength output. The Programmable Laser is a tunable and/or sweepable fiber based laser that delivers picosecond pulses at variable repetition rates and wavelengths. All parameters are configurable through a simple and intuitive user interface running off a PC. The ability to rapidly change wavelengths make it highly desirable for non-linear spectroscopic applications including coherent anti-Stokes Raman scattering (CARS) or Frequency Modulated CARS (FM-CARS) and with the dithering option, stimulated Raman scattering (SRS) spectroscopy which are advanced spectroscopic techniques providing a higher sensitivity than the actual Raman spectroscopy. The other advantage of the system is that each laser can operate independently of each other. This introduces a broad range of applications that can further benefit from this platform.

Genia Photonics picosecond synchronized Programmable Laser can also have two higher power lasers synchronized together allowing such system to be a perfect seed to generate tunable Mid-IR wavelengths through a Difference Frequency Generation Crystal or to Generate Tunable THz radiation. Very fast Mid-IR or THz linear spectroscopy could be performed with such laser.

With Genia Synchronized laser systems Raman shift wavenumbers can be measured for a single or multiple selected ranges within the 0 to 4000 cm-1 band

The Picosecond Synchronized Programmable Laser is a 2010 SPIE Prism Awards finalist in the Life Sciences and Biophotonics category.

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