

Press Release

TOPTICA Photonics AG
Lochhamer Schlag 19
D-82166 Graefelfing / Munich

Elke Marchthaler
Marketing Communication
Manager

Phone + 49 89 85837-123
Fax + 49 89 85837-200
elke.marchthaler@toptica.com

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New: Locking electronics for synchronising femtosecond fiber lasers to other pulsed sources

TOPTICA adds phase-locked-loop synchronisation electronics to its successful series of FemtoFiber[®] scientific lasers

For various applications of femtosecond lasers it is necessary to synchronise the laser pulses to other pulsed instruments. With the new PLL option the FemtoFiber laser can be synchronised to synchrotrons, accelerators, pulsed magnets, or other pulsed lasers, for the use in pump-probe spectroscopy. Alternatively, the FemtoFiber laser can be synchronised to highly stable RF oscillators, for example those referenced to atomic clocks, in order to generate so-called frequency combs. For many of these applications a trouble-free and economical FemtoFiber laser is a better choice than a temperamental and expensive solid-state laser. TOPTICA has therefore developed highly stable phase-locked loop synchronisation electronics to match the low noise of the FemtoFiber scientific laser.

The PLL synchronisation electronics is controlled and monitored via a user-friendly graphical interface on a laptop computer. Various diagnostics parameters show the status and history of the synchronisation, for example the RMS jitter, which is specified below 300 fs. A phase-delay input port enables the user to scan the laser pulses with respect to the reference signal. The variable delay ranges from -400 ps to +400 ps and is thus equivalent to an optical delay line of 12 cm.

The phase delay can be used for pump-probe spectroscopy and optical sampling, for example at synchrotron and accelerator facilities, or in terahertz spectroscopy. Since the FemtoFiber laser can run continuously without user interference it is particularly advantageous for facilities where beam time is valuable. Furthermore, the use of telecom components ensures long product lifetime with a minimum of service and maintenance. Time-domain terahertz spectroscopy benefits particularly from the stability and low noise of the FemtoFiber laser. For applications in industry, the robustness and small size are definite advantages.

The FemtoFiber laser has powerful outputs at 775 and 1550 nm and pulse durations of 100 fs and below. Further options include wavelength-tunable



FemtoFiber scientific laser with PLL-synchronisation electronics and graphical user interface on laptop computer.

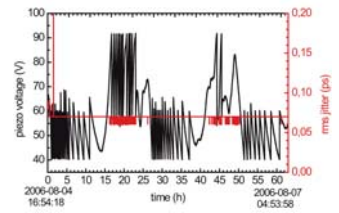


The user-friendly graphical user interface of the PLL option enables the user to control and monitor the synchronisation.

Author:

Dr. Jan Posthumus, TOPTICA Photonics AG

laser beams as well as supercontinuum, both in the visible and the infrared. FemtoFiber lasers are already applied in microscopy, femtosecond spectroscopy, terahertz spectroscopy, frequency metrology and parametric amplifier seeding.



The graph results from a continuous phase lock from Friday afternoon until Monday morning with an RMS jitter of approximately 70 fs. In this case the FemtoFiber laser was synchronised to a crystal oscillator.

TOPTICA Photonics AG develops, manufactures, services and distributes technology-leading diode and fiber lasers and laser systems for scientific and industrial applications. Sales and service is offered worldwide through TOPTICA Germany and its subsidiary TOPTICA USA, as well as all through 13 distributors. A key point of the company philosophy is the close cooperation between development and research to meet our customers' demanding requirements for sophisticated customized system solutions and their subsequent commercialization.

Author:

Dr. Jan Posthumus, TOPTICA Photonics AG