

Patent Number(s): WO2012102953-A1; US2012195330-A1

Title: Laser-based system for delivering high peak power optical pulses from e.g. mode locked fiber laser to e.g. beam scanner, that is used for e.g. spectroscopy, has optical delivery fiber provided between laser source and end-use apparatus

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Abstract: NOVELTY - The system has a nanosecond or picosecond laser source (105-a) for producing high peak power optical pulses, where an end-use apparatus is located apart from the source. An optical delivery fiber e.g. photonic crystal fiber (PCF), is provided between the source and the end-use apparatus, where the fiber and the source are configured, such that a threshold for Raman soliton (RS) generation i.e. stimulated Raman scattering, in the delivery fiber is exceeded, and a wavelength shifted pulse is delivered to the end-use apparatus.

USE - Laser-based system for delivering high peak power optical pulses from a pulsed laser source i.e. fiber lasers such as mode locked fiber laser, q-switched microchip laser and a semiconductor laser and fiber amplifiers such as holey fibers, photonic crystal fibers, photonic bandgap fiber and micro-structured fiber to an end use apparatus such as positioning equipment and beam scanners, that is used for material processing such as laser material processing, spectroscopy and imaging (all claimed). Can also be used for laser source such as oscillator such as mode locked laser oscillator and Erbium or Erbium-Ytterbium doped fiber oscillator, optional pre-amplifier, pulse stretcher and an end-use apparatus for laser cutting, drilling, scribing, surface texturing, patterning and/or marking, pulsed laser deposition, laser spectroscopy, and terahertz generation or detection.

ADVANTAGE - The system ensures that a large area core fiber can allow Raman solitons propagation for delivering high peak power pulses with an approximate Gaussian spatial profile to the end use apparatus, so that scalability of the Raman solitons pulse energy can be improve, while avoiding temporal and spatial degradation of pulses resulting from excessive nonlinear phase change. The doped gain fiber of the pulse source can be extended with an undoped fiber portion, thus reducing the number of components. The spectral filter isolates a Raman shifted pulse portion from a fundamental pulse portion so as to reduce a pedestal of a pulse received at the end-use apparatus.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method for delivering optical pulses.

DESCRIPTION OF DRAWING(S) - The drawing shows a block diagram of a system for delivering high peak power optical pulses from a remotely located laser source to an end use apparatus.

Pulsed laser source (105-a)

Derwent Class Code(s): P81 (Optics); U11 (Semiconductor Materials and Processes); U22 (Pulse Generation and Manipulation, Rectangular wave oscillators); V07 (Fibre-optics and Light Control); V08 (Lasers and Masers); X24 (Electric Welding)

Derwent Manual Code(s): U11-A14; U11-C04C4; U11-C07A4; U11-C09G; U22-D01A6A; V07-F01A1X; V07-K01C2; V07-K04; V07-K05; V07-K10C; V08-A04A; X24-D03B

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