Document details

‹ Back to results | 1 of 1

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Supercontinuum generation from a sub-megahertz repetition rate femtosecond pulses based on nonlinear polarization rotation technique (Article)

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Abstract

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A means of supercontinuum (SC) generation is proposed and demonstrated, using femtosecond mode-locked pulses with sub-megahertz repetition rate based on the nonlinear polarization rotation technique. Total cavity length is approximately 522 m, which includes an additional 500 m single mode fiber (SMF) and the fundamental repetition rate obtained is 404.5 kHz. The mode-locked spectrum has a central wavelength of approximately 1600 nm and a 3 dB bandwidth of 16 nm, which falls within the L-band region. The threshold power for the mode-locked operation is achieved at approximately 52 mW. At pump power of 74 mW, the measured pulse width, pulse energy, and average output power are 70 fs, 18.3 nJ and 7.4 mW respectively. The generated pulses are amplified by a 72.44 mW erbium-doped fiber amplifier before being injected into a 100 m long highly non-linear fiber as the nonlinear medium to generate the SC spectrum. The obtained SC spectrum spans from 1250 nm to more than 1700 nm, with bandwidths of 450 nm at a -70 dBm output power level. For comparison purpose, the 500 m SMF is removed from the setup and similar measurements are then repeated for this case. © 2014 Taylor & Francis.

SciVal Topic Prominence

Topic: Mode-locked Fiber Lasers | Dissipative Solitons | Mode-Locking

Prominence percentile: 98.181

Author keywords

femtosecond pulse | mode-locked fiber laser | nonlinear polarization | rotation | supercontinuum

Indexed keywords

Engineering controlled terms: Electromagnetic pulse | Erbium doped fiber amplifiers | Fiber lasers | Locks (fasteners) | Mode-locked fiber lasers | Optical pumping | Polarization | Pulse generators | Q switched lasers | Rotation | Single mode fibers | Supercontinuum generation | Ultrafast lasers | Ultrashort pulses

Engineering uncontrolled terms: Average output power | Central wavelength | Mode-locked pulse | Mode-locked spectra | Nonlinear polarization rotation | Nonlinear polarizations | Output power levels | Super continuum

Engineering main heading: Plasma diagnostics

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