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Title:Cascaded continuous-wave singly resonant optical parametric oscillator pumped by a single-frequency fiber laser

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Abstract:We present a cascaded continuous-wave singly resonant optical parametric oscillator (SRO) delivering idler output in mid-IR and terahertz frequency range. The SRO was pumped by an ytterbium-doped fiber laser with 27 W linear polarization pump powers, and based on periodically poled MgO:LiNbO₃ crystal (PPMgLN) in two-mirror linear cavity. The PPMgLN is 50 mm long with 29.5 μm/period. The idler power output at 3811 nm was obtained 2.6 W. The additional spectral components that have been attributed to cascaded optical parametric processes are described at increasing pump levels. Besides the initial signal component at about 1476.8nm, further generated wavelengths with frequency shifts about 47 cm⁻¹, 94 cm⁻¹ and 104 cm⁻¹ were observed. It was speculated that the idler waves lie in the terahertz (THz) domain from the observed results. [All rights reserved Elsevier].

Number of references:16

Inspec controlled terms:fibre lasers - lithium compounds - magnesium compounds - niobium compounds - optical parametric oscillators - ytterbium

Uncontrolled terms:cascaded continuous-wave singly resonant optical parametric oscillator - single-frequency fiber laser - linear polarization pump powers - periodically poled crystal - two-mirror linear cavity - power 27 W - size 50 mm - wavelength 29.5 μm - wavelength 3811 nm - power 2.6 W - wavelength 1476.8 nm - LiNbO₃:MgO

Inspec classification codes:A4265K Optical harmonic generation, frequency conversion, parametric oscillation and amplification - A4255N Fibre lasers and amplifiers - A4260B Design of specific laser systems - B4340K Optical harmonic generation, frequency conversion, parametric oscillation and amplification - B4320F Fibre lasers and amplifiers

Numerical data indexing:power 2.7E+01 W;size 5.0E-02 m;wavelength 2.95E-05 m;wavelength 3.811E-06 m;power 2.6E+00 W;wavelength 1.4768E-06 m

Treatment:Practical (PRA)

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