

Abstract Submitted
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3 Watt CW OPO tunable 604nm to 616nm for quantum optics applications ANGUS HENDERSON, Lockheed Martin Aculight, THOMAS HALFMANN, SIMON MIETH, Institute of Applied Physics, Technical University of Darmstadt — A continuous wave optical parametric oscillator (CW OPO) pumped by a fiber laser has been developed which emits up to 3 Watts of single longitudinal mode radiation tunable in the wavelength range 604nm to 616nm. The device is a modified version of the “Argos” Model 2400 commercial product by Lockheed Martin Aculight. A 15 Watt 1064nm fiber laser pumps a CW OPO based upon periodically-poled Lithium Niobate (PPLN). A short section of the nonlinear crystal is poled to allow efficient intracavity sum frequency generation (SFG) between the OPO pump and signal wavelengths to generate orange radiation. The device can be coarsely tuned by matching the poling periods and temperature within the nonlinear crystal to phase-match both OPO and SFG processes simultaneously. Fine mode-hop-free tuning of the orange wavelength of up to 100GHz range can be achieved by applying a voltage to a PZT which tunes the pump laser. By similar intracavity conversion schemes, the system offers the potential of providing high power at wavelengths from 600nm to 1400nm in addition to the direct signal and idler wavelength ranges from 1400nm to 4630nm. Such capability comes without the complexity and reliability issues which are inherent in dye and Ti:Sapphire systems. Details of the OPO system performance and its use in quantum optics applications will be provided.

Angus Henderson
Lockheed Martin Aculight

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