INVITED TALK IQEC/LAT 2002 Moscow

2374

DEVELOPMENTS IN SYNCHRONOUSLY-PUMPED OPTICAL PARAMETRIC OSCILLATORS

David C Hanna
Optoelectronics Research Centre
University of Southampton
Southampton SO17 1BJ
UK

The combination of high peak pump power, via synchronous-pumping, with non-critical phase-matching and large nonlinearity via the use of quasi-phase-matched nonlinear media, allows parametric oscillators with very high parametric gain. This high gain can be exploited in a variety of ways, which will be illustrated in this talk with examples of picosecond and femtosecond synchronously-pumped optical parametric oscillators (SPOPOs) based on the use of periodically-poled lithium niobate (PPLN).

These examples include (1) operation at very long idler wavelengths (approaching 7μm) where the idler absorption in PPLN is very strong (~30cm^{-1}), (2) SPOPO with an optical fibre incorporated into the signal feedback path, (3) operation of a SPOPO with a diffraction-grating as the feedback element, (4) a femtosecond SPOPO pumped by a mode-locked fibre laser MOPA system. These unfamiliar operating conditions reveal some interesting new aspects of OPO behaviour, which will be described.