

## Modern application of lasers

Editorial

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During the last decade an impressive progress in laser technology and new laser applications have been witnessed. Lasers are currently being employed over a huge range of applications including basic research, industrial and material processing, sensing and measurement, biomedicine, environmental science, military, telecommunications, entertainment and many others. The emergence of novel laser applications stimulates also the development of new laser devices, constructions and systems in order to fulfill specific technical parameters which are demanded.

The current issue of the Central European Journal of Physics contains thirteen papers devoted to modern laser technique and applications. Results of theoretical, computational and experimental studies are included in this issue, with contribution from renowned authors from Austria, Finland, Germany, Ireland, Sweden, Poland, Romania, United Kingdom and United States. A brief overview of this issue content is given below.

The paper of Popov *et al.* describes a novel approach

for narrow-band wavelength selection in tunable lasers with the use of diffractive optical elements based on programmable spatial light modulators (SLM). The tunability performance of such device and its modeling are demonstrated using the Fourier formalism. In the work of Nikogosyan *et al.* fabrication of the very small, of 250 nm period nanostructure in fused silica by using the point-by-point inscription is presented. This opens way for the fabrication of first-order Bragg gratings possessing a peak reflectance wavelength of  $\sim 1 \mu\text{m}$ . The performed numerical analysis confirmed the obtained experimental results. Sergeyev *et al.* presents a technique for simultaneous suppression of polarization mode dispersion (PMD) and polarization dependent gain (PDG) in distributed fibre Raman amplifier based on application of two-section fibre. Another paper by the same author reports results on experimental and theoretical characterisation of self-pulsing in high concentration erbium doped fibre laser. Different methods of laser ignition fiber-based systems for internal combustion engines are discussed and evaluated in the paper of Tauer *et al.* The authors presents results on high power optical pulse delivery using conventional step index fibers, hollow-core and photonic band gap fibers. Diode pumped alkali lasers, developed during last several years turns out to be an ideal source for medical applica-

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tions. This subject is reviewed in the paper by Zhdanov *et al.* The application of quantum cascade lasers (QCL) for gas sensing application is discussed in the paper by Zeninari *et al.* This new emerging field of laser applications is drawing wide attention in recent years due to the exceptional sensitivity and flexibility of the QCL based detection methods. Finally a polymer dye laser with Bragg grating reflectors placed along microcavity facets is presented in the paper by Popov *et al.* We believe that many more exciting and novel developments will continue to appear in this field.

The editors would like to thank the authors of all papers in this issue for their excellent contributions as well as many reviewers all over the world who have provided high-quality reviews of the manuscripts submitted to this issue.