

THoB: Novel Solid-State Laser Materials and Devices

Chaired by Klaus Petermann, University of Hamburg, Hamburg, Germany

Time: Thursday 10:30–12:30

Location: Amphi A

Invited THoB.1 Thu 10:30

Volume Bragg Lasers — ●LEONID GLEBOV — CREOL/The College of Optics and Photonics, University of Central Florida, Orlando, FL, USA

The use of volume Bragg gratings in photo-thermo-refractive glass in laser resonators for spectral and angular selection resulted in dramatic improvement of brightness of solid state and diode lasers. These elements were successfully used for stretching and compression of short laser pulses, beam scanning and spectral beam combining.

THoB.2 Thu 11:00

Efficient 1.53 μm emission in Er^{3+} -Si Nps codoped and nanostructured Al_2O_3 films for waveguide amplifiers — ●ROSALIA SERNA¹, SARA NUÑEZ-SANCHEZ¹, MIGUEL JIMENEZ DE CASTRO¹, AMANDA K. PETFORD-LONG², MIHAELA TANASE², and BERND KABIUS² — ¹Laser Processing Group, Instituto de Óptica, CSIC, Serrano 121, 28006 Madrid, Spain — ²Argonne National Laboratory, MSD, Bldg 212, 9700 S Cass Avenue, IL 60439, USA

Large enhancement of the 1.54 μm emission of Er^{3+} ions in nanostructured $\alpha\text{-Al}_2\text{O}_3$ films sensitized with amorphous Si nanoparticles (SiNPs) is reported. A fine tuning of the Er-SiNPs energy transfer can be achieved as a function of the Er-SiNPs separation and the nanoparticle size, therefore enabling the photoluminescence response optimization

THoB.3 Thu 11:15

Diode-side-pumped, passively Q-switched Nd doped ceramic YAG 1.3 μm bounce laser — ●TAKASHIGE OMATSU¹, ARA MINASSIAN², and MICHAEL DAMZEN² — ¹Chiba University, Chiba, Japan — ²Imperial College, London, UK

High average power passively Q-switched 1.3 μm output from a diode-pumped Nd:YAG ceramic bounce laser in combination with a V3+:YAG saturable absorber was produced, for the first time. The maximum output powers of 5.8W and 5W were achieved under multi- and TEM₀₀- mode operations.

THoB.4 Thu 11:30

Realization of hetero composite laser materials — ●PIERRE-OLIVIER PETIT¹, JOHAN PETIT¹, CÉDRIC BOISSIÈRE¹, PHILIPPE GOLDNER¹, BRUNO VIANA¹, JULIEN DIDIERJEAN², and FRANÇOIS BALEMBOIS² — ¹Laboratoire de Chimie de la Matière Condensée de Paris, Paris, France — ²Laboratoire Charles Fabry de l'Institut d'Optique, Palaiseau, France

A low-cost method to bond optical materials has been developed. Hetero-composite laser materials have been successfully realized and laser actions have been demonstrated in Er/Yb glass||sapphire and Nd:YVO₄||sapphire composites. Maximum allowed pumping power is increased by 50% and thermal lensing is lowered by one third under high pumping power.

THoB.5 Thu 11:45

Investigations of NCPM second harmonic generation and self frequency doubling in pure and Nd³⁺ doped Gd_{1-x}R_xCa₄O(BO₃)₃ (R = Sc, Lu) crystals — ●GHEORGHE LUCIAN^{1,2}, LOISEAU PASCAL¹, AKA GÉRARD¹, and LUPEI VOICU² — ¹Ecole Nationale Supérieure de Chimie de Paris, Laboratoire de Chimie Appliquée de l'Etat Solide, 11 rue Pierre et Marie Curie, 75231 Paris Cedex 05, France — ²National Institute for Laser, Plasma and Radiation Physics, Laboratory of Solid State Quantum Electronics, 409 Atomistilor Street, 77125 Bucharest - Magurele, Romania

Pure and Nd³⁺ doped single crystals of Gd_{1-x}R_xCa₄O(BO₃)₃ (R³⁺ = Sc³⁺ or Lu³⁺) with large size and good quality were grown by the Czochralski method. Nonlinear optical properties of these new biaxial crystals are reported. Spectroscopic and laser emission properties of Gd_{1-x}yR_xNd_yCa₄O(BO₃)₃ self frequency doubling crystals have been carried out.

THoB.6 Thu 12:00

Comparative measurements and analysis of the polarization and refractive index changes observed in the Nd³⁺ doped laser materials — ●RÉMI SOULARD¹, RICHARD MONCORGÉ¹, JEAN-LOUIS DOULAN¹, OLEG O. ANTIPOV², OLEG N. EREMEYKIN², EUGENY V. IVAKIN³, and ALIAKSANDR V. SUKHADOLAU³ — ¹Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP)UMR 6252 CEA-CNRS-ENSICAen, Université de Caen, 14050 Caen, France — ²Institute of Applied Physics, Russian Academy of Science, 603950 Nizhny Novgorod, Russia — ³Stepanov Institute of Physics, National Academy of Science of Belarus, 220072 Minsk, Belarus

It is reported a careful investigation of the refractive index variations observed in the most important Nd doped laser crystals including Nd:YAG, Nd:GGG, Nd:YVO₄, Nd:GdVO₄, Nd:KGW, Nd:YAP and Nd:LMA, and in the Nd:Phosphate and Nd:Silicate glasses. It consists in ESA spectroscopy, fluorescence dynamics, transient pump-probe interferometry and diffraction grating measurements.

THoB.7 Thu 12:15

First Angular Measurements of Absorption and Fluorescence in a Monoclinic Crystal — YANNICK PETIT¹, ●BENOIT BOULANGER¹, PATRICIA SEGONDS¹, CORINNE FÉLIX¹, BERTRAND MÉNAERT¹, JULIEN ZACCARO¹, and GÉRARD AKA² — ¹Institut Néel CNRS and University Joseph Fourier, 25 avenue des Martyrs, 38402 Grenoble Cedex 9, France — ²Ecole Nationale Supérieure de Chimie de Paris, France

We report measurements in polarized light of the angular distribution of absorption and fluorescence in a monoclinic crystal. Patterns are close to the biaxial index surface but differences yield the necessity to consider two new frames different than the dielectric frame in which the main values have to be measured.