THp: Thursday Poster Session

Time: Thursday 13:30–14:30 Location: Corridor

THp.1 Thu 13:30

Photosensitivity of Bi-Al-doped silica optical fibers to 193 nm excimer laser irradiation — •Christian Ban[1], Hans Limberger[1], Valery Mashinsky[2], Vladislav Dvoyrin[2], Lenar Bulatov[2], and Evgeny Dianov[2] — [1]Swiss Federal Institute of Technology, Lausanne, 1015 Lausanne, Switzerland — [2]Russian Academy of Science, 119333 Moscow, Russia

The photosensitivity of different Bi-doped fibers under ArF laser irradiation was investigated by Bragg grating inscription. The observed index changes depend on bismuth concentration. Index changes of up to 2.3×10^{-4} have been observed.

THp.2 Thu 13:30

Amplification characteristics of bismuth-doped silica fibres — •Sharon L Vetter[1], Stephane Calvez[1], Martin D Dawson[1], Laurent Bigot[2], Igor Razdobreev[2], and G Bouwmans[2] — [1]Institute of Photonics, University of Strathclyde, 106 Rottenrow, Glasgow, G4 0NW, UK — [2]IRCICA-CERLA, Université des Sciences et Technologies de Lille, 59655 Villeneuve d'Ascq, France

We report the amplification properties of bismuth-doped silica fibres in the 1170 to 1230nm. Amplified stimulated emission measurements suggest that gain bandwidths in excess of 100nm centred around 1150nm should be achievable. We also demonstrate up to 6.7dB of amplification of a 1195nm signal for ˜150mW of 1060nm pump power.

THp.3 Thu 13:30

On the origin of broadband IR luminescence in bismuth-doped glasses — Vyacheslav Sokolov, •Victor Plotnichenko, and Eugeny Dianov — Fiber Optics Research Center, 38 Vavilov Str, Moscow, 119333 Russia

Interstitial negative-charged bismuth dimers, Bi_2^- and Bi_2^{2-}, are suggested as a model of broadband IR luminescence centers in bismuth-doped glasses basing on quantum-chemical calculations of configurations, absorption, luminescence and luminescence excitation spectra of the dimers in alumosilicate network. The model is supported by IR luminescence observed for the first time in bismuth-doped polycrystalline magnesium cordierite.

THp.4 Thu 13:30

Improved Bismuth Doped Aluminogermanate Glass for Broadband Optical Amplification — Mark Hughes, •Yasutake Ohishi, and Takenobu Suzuki — Research Center for Advanced Photon Technology, Toyota Technological Institute, 2-12-1 Hisakata, Tempaku, Nagoya 468-8511, Japan

We demonstrate an improvement in Bi emission properties to the GeO2-Al2O3-Bi2O3 glass system through the addition of 3-4 % molar PbO. This results in a 20 fold increase in quantum efficiency and a 27 fold increase in the product of the peak emission cross section and the emission lifetime (σemτ).

THp.5 Thu 13:30

Numerical and Experimental Study of Pulsed Stimulated Raman Scattering at 2.14 mum in a GeO2 Fibre — •Delphine Gruppi[1], Marc Eichhorn[1], Antoine Hirth[1], and Pierre Pfeiffer[2] — [1]French-German Research Institute of Saint-Louis ISL, 5 rue du Général Cassagnou, BP 70034, 68301 Saint-Louis Cedex, France — [2]Laboratoire des Systèmes Photoniques, University Louis Pasteur Strasbourg, Ecole Nationale Supérieure de Physique, Boulevard Sébastien Brant, BP 10413, 67412 Illkirch Cedex, France

A numerical modeling of Raman conversion in fibres has been developed. Rate equations have been conceived from Feynman-like diagrams. Pulsed Raman conversion from 1.96 mum to 2.14 mum has been obtained in a GeO2-doped core fibre. A comparison between theoretical and experimental results is presented.

THp.6 Thu 13:30

Coaxial Model of Heating of an Active Optical Fiber in Regimes of Photoluminescence and Laser Generation in Ytterbium-Doped Fiber Laser — •Renat Shaidullin[1,2], Vladimir Gainov[1,2], and Oleg Ryabushkin[1,2,3] — [1]'IRE-Polus', Vvedensky Sq. 1, Fryazino, Moscow Region, 141190, Russia — [2]Moscow Institute of Physics and Technology (State University), Institutskiy per. 9, Dolgoprudniy, Moscow Region, 141700, Russia, roa228@mail.ru — [3]Institute of Radio-Engineering and Electronics of RAS, Vvedensky Sq. 1, Fryazino, Moscow Region, 141190, Russia, vg254@rambler.ru

The measurement of the heating of the active optical fiber in lasing regime is realized. Optical pump power dependence of the temperature change of the core is found to have a pronounced singularity near the laser threshold, which divides this dependence into two linear ranges with different slopes.

THp.7 Thu 13:30

Amplitude and phase detection of evanescent field using heterodyne optical feedback on solid-state and fibre laser — Gilles Hervé, Girard Sylvain, and •Laroche Mathieu — CIMAP, Caen, France

Heterodyne optical feedback on a class-B Er doped fibre laser is experimentally investigated as an efficient tool for coherent scanning near-field optical microscopy. Thanks to excitation of the relaxation oscillations of the laser, it allows sensitive measurement of the amplitude and phase of the evanescent wave and near-field imaging.

THp.8 Thu 13:30

Spectroscopy investigation and optical characterization of novel highly Tm doped tellurite glass for optical fiber lasers — •Hrvoje Gebavi[1], Daniel Milanese[1], Mile Ivanda[2], Ozren Gamulin[3], Stephano Taccheo[4], Guihua Liao[1], Jianjun Xing[1], Qiupin Chen[1], and Monica Ferraris[1] — [1]Dipartimento di Scienza dei Materiali ed Ingegneria Chimica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy — [2]Rudjer Boskovic Institute, Bijenicka c. 54, P.O. Box

180, 10002 Zagreb, Croatia — [3]Department of Physics and Biophysics, University of Zagreb, Salata 3, 10 000 Zagreb, Croatia — [4]Dipartmento di Fisica-Politecnico di Milano, Piazza L.Da Vinci 32-20133- Milano, Italy

In this paper optical and spectroscopic properties of 75TeO2-20ZnO-5Na2O host glass doped with concentration of Tm3+ up to 10 mol% were studied. A complete active glass characterization was performed including absorption, Raman and fluorescence spectra, refractive index and lifetime measurements viewing at applications such as short cavity optical fiber lasers.

THp.9 Thu 13:30

Extensive Crystal field Broadening in Nano-scale Er3+-doped Sodium Tellurite Glass Ceramics — Animesh Jha[1], •Purushottam Joshi[2], and Shaoxiong Shen[1] — [1]The Institute for Materials Research, Houldsworth Building, The University of Leeds, LS2 9JT, UK — [2]Corporate Research Laboratory, Laird Technologies India Pvt. Ltd. Bangalore-560066 India

Er3+ doped sodium tellurite glass ceramic shows long lifetime of 5.5 ms and 200 nm bandwidth for the 4I13/2 level. The ceramic process with a significant change in the crystal field leads to the enhancement. The structural change includes the formation of NT8 and decomposition to NT4 and TeO2 polycrystalline.

THp.10 Thu 13:30

High-efficiency passively mode-locked optical parametric oscillators with a continuous-wave pump: theoretical investigation — Jacob B. Khugin[1], Jean-Michel Melkonian[2], •Antoine Godard[2], Michel Lefebvre[2], and Emmanuel Rosencher[2] — [1]Johns Hopkins University, Baltimore, MD 21218, USA — [2]ONERA - the French Aerospace Lab., Chemin de la Hunière, F-91761 Palaiseau cedex, France

We show that gain in an OPO with a large temporal walk-off between the pump and signal saturates like a laser gain and thus CW-pumped OPO can be directly mode-locked. We then propose to use Bragg grating to induce such large temporal walk-off for developing high efficiency passively mode-locked OPOs.

THp.11 Thu 13:30

Yb:CaGdAlO4 from material to high-performance laser — •Pierre-Olivier Petit[1], Philippe Goldner[1], Bruno Viana[1], Justine Boudeile[2], Julien Didierjean[2], Frédéric Druon[2], François Balembois[2], and Patrick Georges[2] — [1]Laboratoire de Chimie de la Matière Condensée de Paris, Paris, France — [2]Laboratoire Charles Fabry de l'Institut d'Optique, Palaiseau, France

Yb:CaGdAlO4 demonstrated very interesting features for one micron diode-pumped femtosecond and high power lasers. Some aspects of the crystal growth and related defects have been investigated. Then, performances of Yb:CaGdAlO4 for ytterbium concentration ranging from 2% to 5% under low and high power diode pumping will be presented.

THp.12 Thu 13:30

Double Pulse Operation of an Intracavity Synchronously Pumped Picosecond Optical Parametric Oscillator — •Alena Zavadilova[1], Vaclav Kubecek[1], Jean-Claude Diels[2], and Andreas Velten[2] — [1]Czech Technical University, Faculty of Nuclear Sciences & Physical Engineering, Prague, Czech Republic — [2]University of New Mexico, Department of Physics and Astronomy and Center for High Technology Materials, Albuquerque, USA

We designed a synchronously pumped OPO with nonlinear crystal (MgO:PPLN) for parametric generation inserted inside a linear resonator of a mode-locked diode pumped Nd:YVO_4 laser. This configuration ensures the same way for signal and pumping waves through the crystal and reduce the dead-band of the beat signal.

THp.13 Thu 13:30

IR to VIS Upconversion in Er and Yb Doped Low Phonon Energy Crystals: Spectroscopic Study and Absolute Efficiency Measurements — •Svetlana Ivanova[1,2], Fabienne Pellé[1], Bruno Viana[1], and Alexandra Tkachuk[2,3] — [1]LCMCP UMR 7574 CNRS - Université P&M Curie-ENSCP, Paris F-75235, France — [2]University of Information Technology, Mechanics and Optics, 12, Birzhevaya line, 199034, St. Petersburg, Russia — [3]Scientific Production Corporation "S.I. Vavilov State Optical Institute", 12, Birzhevaya line, 199034, St. Petersburg, Russia

We report on the results of absolute IR-VIS upconversion efficiency measurements performed for Er and Er-Yb doped CaF2, Ca0.89Y0.11F2.11, LiYF4 and Na0.4Y0.6F2.2 crystals. The setup and method will be presented in details. Spectroscopic characterization of the studied materials was performed in order to provide interpretation of the obtained results.

THp.14 Thu 13:30

Laser performance of Yb:YCa4O(BO3)3 crystals with different orientation — •Junhai Liu[1], Huaijin Zhang[2], Jiyang Wang[2], and Valentin Petrov[3] — [1]College of Physics, Qingdao University, Ning-Xia Road 308, Qingdao 266071, China — [2]National Laboratory of Crystal Materials, Shandong University, Jinan 250100, China — [3]Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy, 2A Max-Born-Str., D-12489 Berlin, Germany

Efficient cw laser operation of X-, Y-, and Z-cut Yb:YCOB crystals is demonstrated. Maximum output powers of 6.3-7.3 W are obtained with slope efficiency in the 73%-83% range. The X-cut ensures weakest effect of the output coupler transmission on the polarization state of the output and the oscillation wavelength.

THp.15 Thu 13:30

Tm^{3+}:$GdLiF_4$ 2-μm Laser Material: Growth, Spectroscopy and Laser Results — •Francesco Cornacchia, Alberto Di Lieto, and Mauro Tonelli — NEST - INFM - CNR - Dipartimento di Fisica dell'Universita' di Pisa, Largo B. Pontecorvo 3,

We report the growth, spectroscopy and laser results of Tm:GLF single crystals (doping density 0.3%, 8% and 12%). We obtained 34% as maximum slope efficiency with a max-

imum output power of 160 mW and a minimum lasing threshold of 60 mW.

THp.16 Thu 13:30

Laser Action and Laser Gain Characterisation in Heavily Doped Yb:YLF Under CW Diode Pumping at Room Temperature — •Guido Toci[1], Matteo Vannini[1], Daniele Alderighi[1], Daniela Parisi[2], Francesco Cornacchia[2], and Mauro Tonelli[2] — [1]Applied Physics Insitute "Nello Carrara", National Research Council, IFAC-CNR, Via Madonna del Piano 10C, I-50019 Sesto Fiorentino (FI), Italy — [2]NEST - Physics Department - Pisa University, Largo B. Pontecorvo 3 I-56127 Pisa, Italy

We present an efficient laser action at room temperature of heavily Yb-doped YLF under longitudinal CW and quasi-CW diode laser pumping at 940 nm. We obtained up to 1.15 W with an absorbed pump power of 6 W (slope efficiency 31%). We also investigated the material small signal gain properties.

THp.17 Thu 13:30

Tunability of Lasers Based on Yb^{3+}-doped Fluorides Yb:SrF_2 and Yb:SrF_2-CaF_2 — •Jan Šulc[1], Helena Jelínková[1], Tasoltan T. Basiev[2], Maxim E. Doroshenko[2], Vyacheslav V. Osiko[2], Mikhail V. Fedorov[2], Vasily A. Konyushkin[2], and Sergei V. Kouznetzov[2] — [1]Czech Technical University, Faculty of Nuclear Sciences and Physical Engineering, Prague, Czech Republic — [2]Laser Materials and Technology Research Center, General Physics Institute, Moscow, Russian Federation

Ytterbium doped fluorides SrF_2 and SrF_2-CaF_2 were investigated as an active medium in diode pumped laser, tunable using birefringent filter. Smooth and broad tunability was reached using these crystals ($1002 - 1078$ nm for Yb:SrF_2, $1004 - 1083$ nm for Yb:SrF_2-CaF_2). For comparison Yb:YAG crystal was tested in the same arrangement.

THp.18 Thu 13:30

Luminescence and laser properties of Yb3+ doped (Ca,Sr,Ba)F2 single crystals at cryogenic temperatures — Jean-Louis Doualan, •Patrice Camy, Abdel Benayad, Vivien Ménard, and Richard Moncorgé — Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP) UMR 6637 CEA-CNRS-ENSICaen, Université de Caen, 14050 Caen, France

Luminescence and laser properties of uncompensated Yb3+ doped CaF2 SrF2 and BaF2 crystals are investigated at cryogenic temperatures. Both absorption cross-section around 980 nm and emission cross-section around 1030 nm significantly increase by going down to 77K. Parallelly, laser thresholds and laser efficiencies improve by more than 20%.

THp.19 Thu 13:30

Compact, longitudinally stack-pumped, passively Q-switched Nd:YAG oscillator — •Sandra Mebben, Rafael Huss, Ralf Wilhelm, Joerg Neumann, and Dietmar Kracht — Laser Zentrum Hannover e.V., Hollerithallee 8, D-30419 Hannover, Germany

A longitudinally stack-pumped, passively Q-switched, polarization stable Nd:YAG oscillator with optical-to-optical efficiency of >7% and M^2<3 at an output energy >2mJ in <4ns pulses is presented. For compact optical design, which enables use in harsh environments, the pump light is transferred into laser rod by a custom designed lens duct.

THp.20 Thu 13:30

Angular Quasi-Phase-Matching : A New Concept — Yannick Petit[1], •Benoit Boulanger[1], Patricia Segonds[1], Pierre Brand[1], Corinne Félix[1], Bertrand Ménaert[1], Hideki Ishizuki[2], and Takunori Taira[2] — [1]Institut Néel CNRS and University Joseph Fourier, 25 avenue des Martyrs, 38402 Grenoble Cedex 9, France — [2]Institute of Molecular Science, 38 Nishigonaka, Myodaili, Okazaki 444-8585, Japan

We propose a generalization of quasi-phase-matching, named as angular quasi-phase-matching, corresponding to a propagation in a periodically poled non linear medium at any angle with respect to the grating vector. Calculations performed on 7% MgO:PPLN show that this configuration provides wider wavelength tuneability and spectral acceptance than quasi-phase-matching.

THp.21 Thu 13:30

Polarization effects in end-pumped passively Q-switched Nd:YAG oscillators — •Rafael Huss, Sandra Mebben, Ralf Wilhelm, Joerg Neumann, and Dietmar Kracht — Laser Zentrum Hannover e.V., Hollerithallee 8, 30419 Hannover, Germany

Polarization effects in a longitudinally pumped Q-switched Nd:YAG oscillator were investigated. Among the main parameters determining the polarization of the laser beam, the polarization of the pump light has a stronger influence than the crystallographic orientation of the saturable absorber Cr4+:YAG with [110]-cut in the cavity.

THp.22 Thu 13:30

Absorption and luminescence properties of chromium doped — •Anatol Yasukevich[1], Sergey Kurilchik[1], Nikolay Kuleshov[1], Alexandr Mudryi[2], Sergey Zhukov[3], and Nikolay Nikonorov[3] — [1]Institute for Optical Materials and Technologies BNTU, Nezavisimosty ave 65, bld. 17, Minsk, 220013, Belarus — [2]Scientific-Practical Material Research Centre of the National Academy of Science of Belarus, P. Brovki str, 19, 220072, Minsk, Belarus — [3]St.Petersburg State University of Information Technologies, Mechanics, and Optics, Kronverksky ave., 49, St.Petersburg, 197101, Russia

Samples of forsterite nanocrystalline glass-ceramics were prepared on the base of silicate glass with addition of Cr2O3oxide.The forsterite nanocrystalline phase is formed as a result of thermal treatment of the virgin glass. Absorption and luminescence spectra of the ceramics revealed dominated presence of Cr4+ ions incorporated into forsterite nanocrystals.

THp.23 Thu 13:30

Oscillation of Yb:KLu(WO4)2 polarized along the Ng principal optical axis — •Junhai Liu[1], Huaijin Zhang[2], Wenjuan Han[2], Valentin Petrov[3], and Jiyang Wang[2] — [1]College of Physics, Qingdao University, Ning-Xia Road 308, Qingdao 266071, China — [2]National Laboratory of Crystal Materials, Shandong University, Ji-

nan 250100, China — [3]Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy, 2A Max-Born-Str., D-12489 Berlin, Germany

Efficient continuous-wave laser oscillation polarized along the Ng principal axis is demonstrated at room temperature with Np-cut Yb:KLuW and Ti:sapphire laser pumping. The output power of 0.55 W at 1044 nm gives an optical-to-optical efficiency of 38%. The slope efficiency of 52% amounts to 83% of that obtained for Nm-polarization.

THp.24 Thu 13:30

Two frequency, orthogonal polarized Nd:YVO4 microchip laser — •Jaroslaw Sotor, Arkadiusz Antonczak, and Krzysztof Abramski — Wyb. Wyspianskiego 27, 50-370 Wroclaw

Conception and practical realization of two frequency, orthogonally polarized Nd :YVO4 microchip laser are presented. Polarization analyzes of output laser radiation is shown. Beat frequency between orthogonal modes was investigated by temperature tuning of the laser and changing the laser crystal thickness.

THp.25 Thu 13:30

High Efficiency Generation of Second and Fourth Harmonic of Nd:YAG — •Rajat Marwah, Sandra Mebben, Rafael Huss, Jörg Neumann, and Dietmar Kracht — Laser Zentrum Hannover e.V., Hollerithallee 8, D-30419 Hannover, Germany.

Frequency conversion using nonlinear crystals has been studied with emphasis on Q-switched Nd:YAG laser. The design developed is highly efficient (>80% for 532nm; >40% for 266nm), compact, and scalable for both higher pulse energies and repetition rates. Advantages of frequency conversion using elliptical beams are also discussed.

THp.26 Thu 13:30

Radiofrequency Impedance Spectroscopy of the Nonlinear-Optical Interaction of High Power Laser Radiation with Crystals — •Aleksei Konyashkin[1,2], Valentin Tyrtyshnyy[3], Aleksei Doronkin[3], and Oleg Ryabushkin[1,2,3] — [1]Institute of Radio-engineering and Electronics of RAS, Vvedensky Sq.1, Fryazino Moscow region, 141190, Russia — [2]NTO IRE-Polus, Vvedensky Sq.1, Fryazino Moscow region, 141190, Russia — [3]Moscow Institute of Physics and Technology, Institutskii per. 9, Dolgoprudny Moscow region, 141700, Russia

Influence of the laser radiation on the piezoelectric resonance in the KTP crystal was observed. Novel technique for investigating the nonlinear optical interaction of high power laser radiation with nonlinear-optical crystals is introduced

THp.27 Thu 13:30

Stimulated emission from neat film of new organic materials — •Hadi Rabbani[1], Sébastien Forget[1], Sébastien Chenais[1], Mélanie Lebental[1], and Elena Ishow[2] — [1]Laboratoire de Physique des Lasers, CNRS/Université Paris 13, Villetaneuse France — [2]Laboratoire de Photophysique et Photochimie Supramoléculaires et Macromoléculaires, ENS Cachan, Cachan, France

We report on amplified spontaneous emission and gain measurements in a neat film of a new organic material ((4-di(4*-tert-butylbiphenyl-4-yl)amino-4*-dicyanovinylbenzene) with limited quenching effects. Lasing operation in dynamic DFB cavities, comparison with well-known DCM doped into PMMA matrix and accurate modelling of the gain behaviour are also presented.

THp.28 Thu 13:30

A Time-Dependent Analytical Thermal Model To Investigate Thermally Induced Stresses In Quasi-CW-Pumped Laser Rods — •Edward H. Bernhardi[1,2], Andrew Forbes[1,2], Christoph Bollig[1], and M.J.Daniel Esser[1] — [1]CSIR, National Laser Centre, PO Box 395, Building 46, Pretoria, South Africa, 0001 — [2]School of Physics, University of Kwazulu-Natal, Private Bag X54001, Durban, South Africa, 4000

A time-dependent analytical thermal model that determines the transient temperature and thermally induced stress profiles in laser rods is developed. The model is applied to a QCW-end-pumped Tm:YLF laser rod and the solutions are found to be consistent with three-dimensional time-dependent finite element numerical models.