Workshop
High Brightness Laser Sources and their Applications
Burgdorf, 26 November 2009

Dr. Franz Baumberger Burgdorf BE

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Study of mathematics and bioorganic chemistry with Prof. Dr. A. Vasella (UNI ZH / ETH). Experience in pharmaceutical research. Since 1988 member of the staff first at ISB, then HTA-Bu and now BFH TI. 1999 I got responsible for aR&D / TT of the department and today I am dean of the master studies, too.

Welcome

Dr. Christoph Harder Schindellegi SZ

President Swisslaser.net, Schindellegi SZ
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Dr. Christoph Harder received the Electrical Engineering Diploma from the ETH in 1979 and the Master and PhD in Electrical Engineering in 1980 and 1983 from Caltech, Pasadena, USA. He is co-founder of the IBM Zurich Laser Diode Enterprise which pioneered the first 980nm high power pump laser for telecom optical amplifiers.
He has been managing during the last few years the high power laser diode R&D effort in Zurich expanding, working closely with a multitude of customers, the product range into 14xx pumps as well as 808 and 9xx multimode pumps for industrial applications. He has published more than 100 papers and 20 patents and has held a variety of staff and management positions at ETH, Caltech, IBM, Uniphase, JDS Uniphase, Nortel and Bookham.

Introduction

Prof. Thomas Feurer Bern

Institute for Applied Physics, University of Bern
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2004 - present: University of Bern, Switzerland: Co-Director, Institute of Applied Physics. 2001 Habilitation, Experimental Physics
2001 - 2004 Massachusetts Institute of Technology, Cambridge: MA, USA, Department of Chemistry.
1994 - 2001 Friedrich-Schiller-University, Jena, Germany: Department of Physics.
1991 - 1994 Julius-Maximilians-University, Würzburg, Germany: Department of Physics.
1990 - 1991 Rice University, Houston, Texas, USA, Department of Electrical Engineering.
Member of the German Physical Society (DPG), the American Physical Society (APS) and the Optical Society of America (OSA).

Overview and Trends
In this talk I will present an overview on current fiber laser activities and application areas in general terms, but I will also present some of our own activities. These include highly wavelength-stabilized fiber lasers or femtosecond fiber laser systems.

Dr. Eric Mottay
Pessac FR

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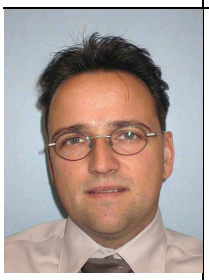
Dr. Eric Mottay is the president and CEO of Amplitude Systemes, France, a company he founded in 2001 and which is now a leader in diode-pumped ultrafast lasers. Eric graduated from the Ecole Superieure d'Optique, Orsay, in 1985, and has since specialized in laser development and manufacturing. He previously developed and brought to the market numerous solid-state lasers in different positions in Europe and the United States.

Pulsed Fiber Lasers
Ultrafast laser micromachining is a high quality, high flexibility process, with numerous potential industrial applications. The reduced thermal effects and the capability to process virtually any material are key advantages of this technology. Until recently, the processing speed was limited by the average laser power available. We present high power ultrafast fiber lasers and examples of high speed micro-processing.



Beat Sidler
Baar ZG

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Beat Sidler received the Electrical Engineering Diploma from the Lucerne University of Applied Sciences in 1993 and the Executive Master of Business Studies Diploma in 2000. He joined TRUMPF in 2000 and is Head of the Laser Division in Switzerland.

High Power Disk Lasers and Applications
The third TruDisk generation is setting new standards as a tool in industrial materials processing. Compared to the previous generation, the lasers now have twice the output per disk and come with outputs of up to 16 kw. The high beam qualities of 2, 4 and 8 mm*mrad facilitate both remote welding from a great distance as well as applications in the powertrain range.

Dr. Ulrich Dürr
Thun BE

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Dr. Ulrich Dürr is member of the board at LASAG AG in Thun and responsible for Technology and Innovation.

Rod- versus Fiberlaser in thermal laser microprocessing
In thermal laser processing like micro-cutting, -welding or -drilling, the fiberlaser is getting acceptance because of superior efficiency, compactness and stability at high beam quality. The different beam properties of a lamp pumped pulsed rod laser and a cw-modulated SM fiberlaser require different process strategies and system solutions. This presentation will discuss the strengths and shortcomings of the two technologies in selected markets.

Dipl. Ing.
Michael Grupp
Burbach DE

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Dipl.-Ing. Michael Grupp studied mechanical engineering at the University of Stuttgart. After his study he worked as scientific staff at the Bremer Institut für angewandte Strahltechnik BIAS on the fields of laser welding, cladding and surface treatment. Since 2005 he is the head of the application laboratory at IPG Laser GmbH, Burbach.

High Power Fibre Lasers and Applications
New developments in fibre laser technology extend the range of applications and enable new processing technologies. This presentation gives an overview on the current status and new developments in laser sources and their applications as well as on applications in which fibre lasers today are settled as a standard.

Dr. Alexandre Pauchard
Ecublens VD

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Dr. Alexandre Pauchard is CTO at Synova, heading the Engineering, R&D, Project Management and Application departments. Previously he was VP Engineering at id Quantique, Director of Engineering at Nova Crystals (California), Visiting Scholar at UCSD and at the Delft University of Technology. He holds M.S. in Physics from ETH and PhD from EPFL. He has published 80 papers and was awarded 8 international patents.

Laser MicroJet
The basic principle of the water jet-guided laser technology is to focus high-power, pulsed laser beams into a hair-thin, low-pressure water jet. The jet guides the laser beam onto the sample. This concept prevents heat damage by cooling the cutting edges in between the laser pulses and removes any molten material generated. This presentation will cover the various applications of this technology.

Dr. Andreas Lüdi
Niederönz BE

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Andreas Lüdi received the MS and the PhD degree in Physics from the University of Berne in 1998 and 2002, respectively.
After different scientific activities at research institutes (Uni Bern and MOL DWD) and the Swiss administration, he works for Bystronic in the R&D Department since early 2007.
He is responsible for research on fiber laser cutting.

Sheet Metal Cutting with Fiber Lasers
As it is known today, fiber lasers have more problems to cut thicker sheet metals than comparable CO_2-lasers. Pros and cons as well as limitations of fiber lasers for sheet metal cutting are discussed. Furthermore some approaches to improve the cutting possibilities of fiber lasers are shown.

Dr.
Kurt Weingarten
Zürich

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Kurt received his PhD and Masters in Electrical Engineering at Stanford University, where he developed ultrafast electro-optical measurements on integrated circuits using picosecond lasers, and a BSEE at Georgia Tech in Atlanta. Kurt founded Time-Bandwidth Products in 1995 to develop simple, robust ultrafast mode-locked lasers for scientific and industrial applications. He founded the VC-funded telecom start-up GigaTera in 2000, which was later acquired by TBP in 2003.

Precision Cold Ablation Material Processing using High-Power Picosecond Lasers
The high peak power and short pulse widths of current picosecond laser systems allows for novel precision material processing via *cold ablation* (e.g. virtually no heat-affected zone, recast, or microcracking). This has many new applications in areas such as precision micromachining of metals, semiconductors, dielectrics, and thin films such as required in solar cell and flat-panel display technology. We review the picosecond laser system performance and show typically examples of micromachined structures.