

First International School on Laser Applications



Report of Contributions

Contribution ID: 0

Type: **not specified**

Introduction to Lasers I

Monday, 15 October 2012 09:30 (1 hour)

- Laser fundamentals
- Optical resonators
- Gaussian Beams
- Laser Pumping
- Multimode lasing

Presenter: Prof. ROSO, Luis (CLPU)

Contribution ID: 2

Type: **not specified**

Introduction to Lasers II

Monday, 15 October 2012 11:00 (1 hour)

Introduction to atomic physics for laser spectroscopy including:

- Line broadening
- Different spectroscopy techniques, incl. non-linear
- The search of ionization schemes
- Hyperfine splitting for isomer selection and nuclear physics measurements

Presenter: Prof. BILLOWES, Jonathan (University of Manchester)

Contribution ID: 3

Type: **not specified**

Beam Shaping

Monday, 15 October 2012 12:00 (1 hour)

Laser beam transport covering:

- Optical transport theory, how to preserve laser parameters
- Experimental feedback on how to handle optics
- High beam power transport, remote control
- Losses, things not to do, some laser safety considerations

Presenter: Dr DIVALL, Martha (PSI)

Contribution ID: 4

Type: **not specified**

Introduction to accelerators

Monday, 15 October 2012 14:30 (1 hour)

- Brief history of accelerators
- Electron and ion sources, linear accelerators, synchrotron
- Beam properties:
 - Equation of motion
 - Concept of beam emittance
 - Beam size, bunch length and other parameters to be measured
- rf cavity/laser analogies

Presenter: Prof. WELSCH, Carsten (University of Liverpool)

Contribution ID: 5

Type: **not specified**

Application of electron accelerators –principles of free electron lasers

Monday, 15 October 2012 15:30 (1 hour)

Presenter: Prof. GILLESPIE, Allan (University of Dundee)

Contribution ID: 6

Type: **not specified**

Characterisation of the laser output

Tuesday, 16 October 2012 08:30 (1 hour)

- What properties are required (for different applications)?
Quality definition.
- Wavelength and spectrum
- temporal/spatial profile
- Power
- cw/pulsed lasers

Presenter: Dr WALSH, David (University of Dundee)

Contribution ID: 7

Type: **not specified**

Laser Ion Sources I

Tuesday, 16 October 2012 09:30 (1 hour)

Presenter: Mr MARSH, Bruce (CERN)

Contribution ID: 8

Type: **not specified**

Laser Ion Sources II

Tuesday, 16 October 2012 11:00 (1 hour)

Presenter: Mr MARSH, Bruce (CERN)

Contribution ID: 9

Type: **not specified**

Laser Acceleration I

Tuesday, 16 October 2012 12:00 (1 hour)

- Introduction of laser-plasma electron acceleration
- Basic theoretical background:
 - o Plasma wave excitation
 - o Wavebreaking
 - o Electron dynamics in plasma
 - o Electron injection method

Presenter: Dr IRMAN, Arie (HZDR)

Contribution ID: **10**

Type: **not specified**

Laser Acceleration II

Tuesday, 16 October 2012 14:30 (1 hour)

Recent progress in laser-plasma electron acceleration experiment

Presenter: Dr IRMAN, Arie (HZDR)

Contribution ID: **11**

Type: **not specified**

Non-linear optics techniques in laser-accelerator systems

Tuesday, 16 October 2012 17:00 (1 hour)

Presenter: Dr WALSH, David (University of Dundee)

Contribution ID: 12

Type: **not specified**

Beam Diagnostics using lasers I

Wednesday, 17 October 2012 08:30 (1 hour)

- Transverse beam profile measurements
- Laser wire scanners
- Quality of incoming beam
- Current limitations/R&D efforts internationally

Presenter: Dr CORNER, Laura (John Adams Institute - Oxford)

Contribution ID: 13

Type: **not specified**

Beam Diagnostics using lasers II

Wednesday, 17 October 2012 09:30 (1 hour)

- Importance of longitudinal beam diagnostics in accelerators and advanced light sources
- Longitudinal diagnostics –A comparison of experimental techniques
- Determining the detailed bunch temporal profile using electro-optic (EO) techniques
- Laser ‘metamaterials’ processing for EO techniques

Presenter: Prof. GILLESPIE, Allan (University of Dundee)

Contribution ID: 14

Type: **not specified**

Seminar on X-ray FEL sources.

Wednesday, 17 October 2012 11:00 (1 hour)

Presenter: Dr PATTHEY, Luc (PSI)

Contribution ID: **16**

Type: **not specified**

Laser materials

Wednesday, 17 October 2012 12:00 (1 hour)

CIMAP laser development group

Current research including:

- Solid state lasers
- Fibre lasers

Presenter: Mr GILLES, Hervé (CIMAP)

Contribution ID: 17

Type: **not specified**

Laser optical clocks and accelerator timing systems

Thursday, 18 October 2012 08:30 (1 hour)

- Challenges in ultra-fast timing systems
- Synchronization
- Current state-of-the-art (ideally with facility examples) / future R&D program

Presenter: Dr THAKKER, Trina (STFC)

Contribution ID: **18**

Type: **not specified**

Optical laser requirements, developments and simulations at the European XFEL

Thursday, 18 October 2012 09:30 (1 hour)

- Optical laser requirements and developments for the X-Ray experiments at the European XFEL
- Simulations of fibre and parametric amplifiers
- Other aspects of ultrafast lasers

Presenter: Dr LEDERER, Max (European XFEL GmbH)

Contribution ID: **19**

Type: **not specified**

Ultrashort pulsed lasers

Thursday, 18 October 2012 11:00 (1 hour)

- Fundamental properties of short light pulses (spectral coherence, high intensities)
- Mathematical description of short laser pulses and basic pulse distortion/shaping effects (dispersion, chirps)
- Generation and measurement of short pulses
- Nonlinear-optical light conversion to other spectral (e.g. XUV) and temporal (e.g. attosecond) ranges
- Some selected experimental applications

Presenter: Dr PFEIFFER, Thomas (MPIK, Heidelberg, Germany)

Contribution ID: 20

Type: **not specified**

Seminar ELI installation: Taking European research to the next level

Thursday, 18 October 2012 17:00 (1 hour)

Presenter: Prof. LEDINGHAM, Ken (Strathclyde University)

Contribution ID: 23

Type: **not specified**

Industry I : What's in it and how do we get there - industrial applications of laser acceleration

Friday, 19 October 2012 11:00 (30 minutes)

- Industrial applications of laser acceleration
- Examples of today's successful applications of accelerators in industry
- The requirements for achieving controlled and reproducible charged particle beams
- State-of-the-art beam transport and beam diagnostic components and their applicability in future compact laser acceleration based systems

Presenter: Dr BAURICHTER, Arnd (Danfysik)

Contribution ID: 24

Type: **not specified**

Cooperation between industry and research institutes

Friday, 19 October 2012 11:30 (30 minutes)

- Cosylab is a spin-off from a research institute
- What are the less obvious but still important reasons for cooperation?
- our community is used to cooperation: even when the industrial company is a suppliers and the institute is the customer
- joint-ventures between institutes and industry
- a different kind of of cooperation: not just on research, but also to gain market knowhow and find new employees

Presenter: Mr PLESKO, Mark (Cosylab)

Contribution ID: 25

Type: **not specified**

Industry II : Solutions to the photonics industry: from a customer s idea to an off-the-shelf product

Friday, 19 October 2012 12:00 (30 minutes)

- Thorlabs' core competencies
- Generation, collection, and development of new product ideas using an open forum
- The product development process: How a worldwide team of engineers, physicists, web programmers and designers transfers a product idea into a catalogue product
- Brief insight into the logistics required to provide the service of same-day shipment

Presenter: Dr VIGROUX, Julien (Thorlabs)

Contribution ID: 26

Type: **not specified**

Challenges in Industry / School Conclusion

Friday, 19 October 2012 12:30 (30 minutes)

- The provision of laser products adapted for specific market needs
- Development, manufacture and supply

Presenter: Dr HELLSTRÖM, Jonas

Contribution ID: 27

Type: **not specified**

Welcome / Introduction

Monday, 15 October 2012 08:30 (1 hour)

Presenters: Prof. WELSCH, Carsten (University of Liverpool); Dr LEWITOWICZ, Marek (Deputy Director, GANIL); Dr LECESNE, Nathalie (GANIL)

Contribution ID: 28

Type: **not specified**

POSTERS

Contribution ID: 29

Type: **not specified**

STUDY SESSION