

FEL2004

**26th International Free-Electron Laser Conference and
11th FEL User-Workshop**

CONFERENCE PROGRAMME AND ABSTRACTS

ORGANIZED BY

Sincrotrone Trieste (ELETTRA)
Strada Statale 14 - km 163,5 in AREA Science Park
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ORGANIZING SECRETARIAT

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FEL2004

26th International Free-Electron Laser Conference and 11th FEL User-Workshop

August 29 to September 3, 2004

Stazione Marittima, Trieste, Italy

INSTITUTIONAL SPONSORS

Area Science Park

Consiglio Nazionale delle Ricerche (CNR)

Council for the Central Laboratory of the Research Councils (CCLRC)

Deutsches Elektronen Synchrotron in der Helmholtz Gemeinschaft (DESY)

Ente per le Nuove tecnologie, l'Energia e l'Ambiente (ENEA)

Istituto Nazionale di Fisica Nucleare (INFN)

Sincrotrone Trieste (ELETTRA)

INDUSTRIAL SPONSORS AND EXHIBITORS

Accel Instruments

Advanced Energy Systems

C.A.E.N. – Costruzioni Apparecchiature Elettroniche Nucleari

CINEL - Strumenti Scientifici

Cinquepascal

CPI – Communications & Power Industries International Inc.

Danfysik

Instrumentation Technologies

Lecroy

MBE – Mediterranean Broadcasting Equipment Ltd.

Micos Italia

RMP – Meccanica Progettazione Prototipi

Thales Electron Devices

Conference Chairs

René Bakker (Sincrotrone Trieste)

Richard Walker (DLS)

Programme Committee Chairs

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Luca Giannessi (ENEA)

Local Organizing Coordinator

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Marino Marsi (Sincrotrone Trieste)

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I. Lindau (SLAC)	T. Yamazaki (Kyoto U.)
A. Lumpkin (APS/ANL)	L.H. Yu (BNL)
P. Michel (FZ Rossendorf)	

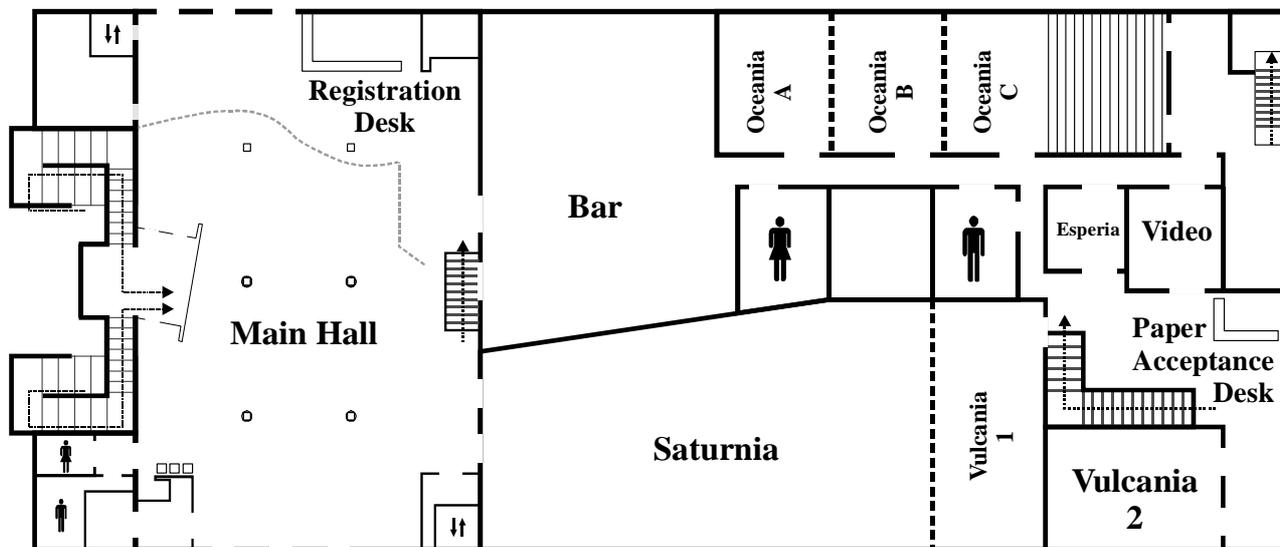
Local Organizing Committee

A. Accettulli	C. Fiandra ¹
I. Andrian	C. Grubissa
L. Biecker ¹	P. Michelini
C.J. Bocchetta	M. Nadalin
D. Bulfone	G. Risicato
G. D'Auria	E. Save
G. De Ninno	R. Skabar
S. Deiuri	M. Trovò
B. Diviacco	

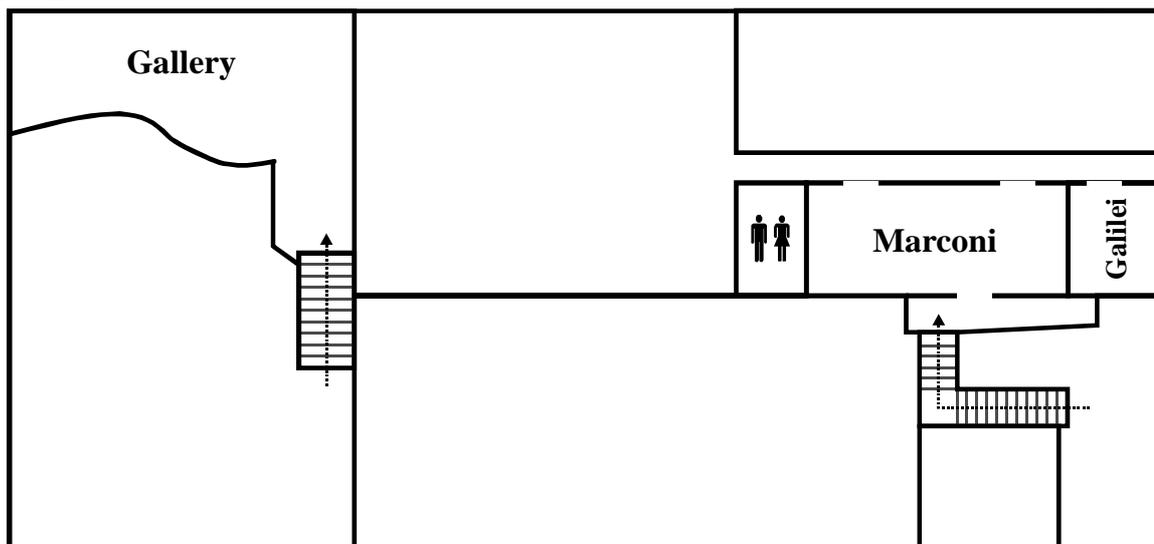
¹ Organizing Secretariat "the office"

STAZIONE MARITTIMA FLOOR PLAN

1st Floor



2nd Floor



First Floor

Main Hall: Registration, Scientific Secretariat, Industrial Exhibition, and Poster Session

Saturnia: Main Lecture Hall

Oceanea C: Secondary Lecture Hall

Vulcania 2: Proceedings Office, Paper Acceptance Desk, and Video Presentation Office



Restrooms

Second Floor

Gallery: Terminal Area and Internet Point

REGISTRATION

The Registration Desk is open on Sunday August 29 from 17:00 to 20:00, on Monday to Thursday from 8:00 to 18:00, and on Friday from 8:00 to 12:30. Participants, who have only registered for the Users Workshop and intend to join the excursion or conference dinner, must present themselves for registration prior to the events.

Payment upon registration at the conference must be made with Credit Card (VISA, Mastercard, or Eurocard) or in cash in Euros (€). *No cheques will be accepted for registration.*

Important Notice: all FEL conference and Users Workshop attendees and accompanying persons must wear their identification badges at all times when inside the conference centre.

PAPER ACCEPTANCE

The Paper Acceptance Desk will be open on Sunday August 29 from 17:00 to 19:00, on Monday to Thursday from 8:00 to 18:00 and on Friday from 8:00 to 12:30. Authors are requested to hand in a paper copy of their paper on Sunday, August 29 or Monday, August 30.

LOCATION OF THE EVENTS

The conference takes place in the “Stazione Marittima”:

Molo Bersaglieri 3, Trieste

Tel. +39-040-304988

Fax. +39-040-310856.

The centre is located directly on the waterfront in the centre of Trieste and a 15 minutes or 1.1 km (0.7 miles) walk South West of the railway station.

The floor plan of the conference centre is shown on the left. The main entrance hall on the first floor hosts the welcome cocktail, the poster sessions, the industrial exhibition, and serves for the coffee breaks. Oral sessions take place in the main lecture hall “Saturnia” or in the lecture hall “Oceania C”. Computers for e-mail and paper modifications are located on the second floor on the Gallery.

Message board, tourist information, etc.

The Registration Desk also serves as message board for participants of the conference and for tourist and travel information. The Registration Desk is open on Sunday August 29 from 17:00 until 20:00, on Monday to Thursday from 8:00 to 18:00, and Friday from 8:00 to 12:30.

Paper Acceptance Desk

The Paper Acceptance Desk is located at the rear-end of the conference centre. It serves to accept the papers and for aid to speakers with electronic presentations. The Paper Acceptance Desk will be open on Sunday August 29 from 17:00 to 19:00, on Monday to Thursday from 8:00 to 18:00 and on Friday from 8:00 to 12:30.

Computer Connections

WiFi network with automatic DHCP will be available throughout the conference centre. Computers with fixed network connection for e-mail and paper modifications are located on the 2nd floor on the Gallery. This area also has spare tables for use with personal laptops and a limited amount of wired network access points for laptops without wireless network. Computer facilities are available throughout the conference from Sunday to Friday.

Conference Dinner

The conference dinner takes place on Wednesday September 1 from 20:30 to 23:00 in the Starhotel Savoia Excelsior, opposite to the conference centre.

SOCIAL PROGRAMME AND VISITS

Welcome Cocktail

- Sunday August 29: 18:00 – 20:00

A get-acquainted Welcome Cocktail with local dishes and wine is offered to all participants of the FEL conference and their accompanying persons. It takes place in the Main hall of the “Stazione Marittima”.

Excursion to Aquileia, Grado and its surroundings

- Wednesday September 1: 13:30 – 19:00

All participants of the FEL conference and Users Workshop are invited for a tour to Aquileia and Grado. Accompanying persons can join for a fee of € 25. Those who did not register for the tour can still do so at the registration desk on Monday and Tuesday. The excursion departs from the conference centre at 13:30 and returns to the same location at 19:00.

Aquileia was founded in 181 BC by the Romans and became an important trading centre and capital of Istria and the region. Today it is a small town with an impressive 11th century basilica and Roman ruins.

Grado used to function as harbour town for Aquileia (gradus = harbour). During the Hapsburg's rule Emperor Franz Joseph appointed the town as Imperial Thermal Place (25 July 1892) and it became one of the favourite resorts of the end-of-century society. Today Grado features some of the nicest beaches of the area as well an historic centre.

Conference Dinner

- Wednesday September 1: 20:30 – 23:00.

The conference dinner takes place at Starhotel Savoia Excelsior, opposite to the conference centre. All participants of the FEL conference and Users Workshop are invited. Accompanying persons can join for a fee of € 50. Those who did not register can still do so at the registration desk from Sunday to Tuesday.

Visit to the ELETTRA Laboratory

- Friday September 3: 14:00 – 17:00

A tour the 3rd generation synchrotron light source ELETTRA, its storage-ring FEL EUFELE and the linac for the FERMI@ELETTRA project will be organized for all participants of the Conference and Users Workshop. Interested persons are kindly requested to register for the tour before Thursday 14:00. Buses leave from the conference centre at 14:00.

INDUSTRIAL EXHIBITION

The industrial exhibit takes place in the Main hall during the conference.

INFORMATION FOR AUTHORS

Paper Submission

Only electronic submission through conference web-interface will be accepted (**no floppies, CD's or memory stick**). The web-page for submission is identical as the one for abstract submission: <http://fel2004.elettra.trieste.it/pls/fel2004>. The final deadline for paper submission is prior to the conference on Wednesday August 25. **Authors must present a paper copy** of their contribution at the Paper Acceptance Desk on **Sunday, August 29 or Monday, August 30**.

Note that only papers for which a corresponding oral or poster presentation has been made will be eligible for publication in the conference proceedings.

Visual Aids for Speakers

Visual presentations can be made electronically using the projector equipment provided by the conference, or with transparencies. *Use of private computers for oral presentations will not be possible*. Electronic presentations must be uploaded to the presentation server (<http://fel2004.elettra.trieste.it/pls/fel2004>) in advance. Only PowerPoint, OpenOffice or PDF format can be accepted. Note that the computer system connected to the projector is running under Windows XP. Special precautions should be taken for .ppt files to beware of unusual fonts, and for .pdf files to be sure to include all fonts when preparing the .ps and .pdf files. A speaker preparation office is located in the Vulcania-2 room to check presentations on the electronic platform provided by the conference centre. Please check with the Paper Acceptance Desk for availability.

For presentations with transparencies, one overhead projector will be available.

No slide projector will be available.

Oral Presentations

All speakers have received information on the duration of their presentation. Please respect those time slots, taking into account the period should also be used to address questions. Speakers are requested to present themselves to the chair person of the session in the coffee break prior to the session.

Speakers with an electronic presentation are advised to check their presentation one day in advance in the Vulcania-2 room. Please check with the Paper Acceptance Desk for availability.

Poster Sessions

The three poster sessions are scheduled to take place in the Main Hall on:

- Monday (MOPOS) from 14:00 to 17:45,
- Tuesday (TUPOS) from 10:45 to 17:45, and
- Thursday (THPOS) from 10:45 to 17:45.

Presenting authors must be at their poster between 14:00 and 16:00. Presenting authors for the Thursday poster session are encouraged to mount their poster Wednesday morning and to dismount them on Thursday afternoon.

Each poster will be displayed on a panel 1.10 m (43.3") wide and 1.30 m (51.2") high. Posters should be mounted before 14:00 on Monday and before 10:45 on Tuesday and Thursday. Posters should be dismounted after 17:45.

Programme Overview

		Monday August 30	Tuesday August 31	Wednesday September 1	Thursday September 2	Friday September 3	
Registration* and Welcome Cocktail Sunday, August 29, 18:00 - 20:00	8:00 - 8:30	Coffee					
	8:30 - 10:15	Opening Session	FEL Technology I	FEL Experiments	Joint Session FEL / Workshop	Biological and Medical Sciences	
	10:15 - 10:45	Coffee					
	10:45 - 12:30	Single Pass FELs	FEL Technology II <small>Poster</small>	New Concepts and Ideas	Gun Injector Tech- nology	Physical and Chemical Sciences <small>Poster</small>	Closing Session
	12:30 - 14:00	Lunch			Lunch		
	14:00 - 16:00	Poster Session and Coffee	Poster Session and Coffee	Excursion 13:30 - 19:00	Poster Session and Coffee	Visit ELETTRA until 17:00	
	16:00 - 17:45	FEL Theory <small>Poster</small>	FEL Oscillators <small>Poster</small>		Short-wavelength FEL applications <small>Poster</small>		
				Conference Dinner 20:30 - 23:00			

* registration on Sunday from 17:00 to 20:00

Legenda:

- ▴ FEL Conference
- ▾ Users Workshop

Monday August 30

08:30-10:15

Location: Saturnia

Opening Session

Chair: Richard Walker (DIAMOND)

- 08:30-08:45 **MOAIS01** 15 min **Opening**
René Johan Bakker (Elettra, Basovizza, Trieste)
- 08:45-09:00 **MOAIS02** 15 min **Welcome Addresses**
- 09:00-09:45 **MOAIS03** 45 min **FEL Prize Talk: R&D Experiments at BNL to Address the Associated Issues in the Cascading HGHG Scheme**
Li-Hua Yu (BNL, Upton, Long Island, New York)
- 09:45-10:00 **MOAIS04** 15 min **First Lasing at the ELBE mid-IR FEL (invited)**
Peter Michel (Forschungszentrum Rossendorf, Dresden - Sachsen)
- 10:00-10:15 **MOAIS05** 15 min **Information on the Programme and Proceedings**
Luca Giannessi (ENEA C.R. Frascati, Frascati - Roma)

Monday August 30

10:45-12:30

Location: Saturnia

Single Pass FELs

Chair: John Galayda (SLAC)

- | | | | |
|-------------|----------------|--------|--|
| 10:45-11:20 | MOBIS01 | 35 min | Overview of Single Pass FEL Designs (invited)
Tsumoru Shintake (RIKEN Spring-8 Harima, Hyogo) |
| 11:20-11:40 | MOBOS02 | 20 min | Scheme for Generation of Single 100 GW 300-as Pulse in the X-ray SASE FEL with the Use of a Few Cycles Optical Pulse from Ti:Sapphire Laser System
Evgeny Saldin (DESY, Hamburg) |
| 11:40-12:00 | MOBOS03 | 20 min | An Experimental Study of the Beam-Steering Effect on the FEL Gain at LEUTL's Segmented Undulators
Yong-Chul Chae (ANL/APS, Argonne, Illinois) |
| 12:00-12:15 | MOBOS04 | 15 min | Suppression of Microbunching Instability in the Linac Coherent Light Source
Zhirong Huang (SLAC, Menlo Park, California) |
| 12:15-12:30 | MOBOS05 | 15 min | Generation of Narrow Linewidth X-rays by a Harmonic Cascade FEL
William S Graves (MIT/BLAC, Middleton, Massachusetts) |

Monday August 30

16:00-17:45

Location: Saturnia

FEL Theory

Chair: Li-Hua Yu (BNL)

- 16:00-16:35 MOCIS01 35 min **Bunching, non Linear Harmonic Generation, Exotic Undulators and Cascade Undulator FELs (invited)**
Giuseppe Dattoli (ENEA C.R. Frascati, Frascati - Roma)
- 16:35-17:00 MOCOS02 25 min **Spectral Properties of FEL Oscillators: New Theoretical and Experimental Results on the Super-ACO FEL**
Serge Bielawski (PhLAM, Villeneuve d'Ascq)
- 17:00-17:15 MOCOS03 15 min **Backward Wave Excitation and Generation of Oscillations in Distributed Gain Media and Free-Electron Lasers in the Absence of Feedback**
Yosef Pinhasi (The College of Judea and Samaria, Ariel)
- 17:15-17:30 MOCOS04 15 min **Nonlinear Harmonic Generation in Free-Electron Lasers with Helical Wigglers**
Henry Freund (SAIC McLean, McLean)
- 17:30-17:45 MOCOS05 15 min **CSRtrack: Faster Calculations of 3D CSR Effects**
Torsten Limberg (DESY, Hamburg)

Location: Main Hall

Poster Session

10:45-17:45 MOPOS **Single Pass FELs, FEL Theory**

Tuesday August 31

08:30-10:15

Location: Saturnia

FEL Technology I

Chair: Dirk Noelle (DESY)

- 08:30-09:05 **TUAIS01** 35 min **Sub-Picosecond Electron Bunch Length Measurements at SLAC (invited)**
Patrick Krejcik (SLAC/LCLS, Menlo Park, California)
- 09:05-09:30 **TUAOS02** 25 min **Bunch Compressors for XFELs against Microbunching Instability and CSR**
Yujong Kim (DESY, Hamburg)
- 09:30-09:45 **TUAOS03** 15 min **Large-Scale Timing Distribution and RF-Synchronization for FEL-Facilities**
Jung-Won Kim (MIT, Cambridge, Massachusetts)
- 09:45-10:00 **TUAOS04** 15 min **Real-Time, Non-Destructive, Single-Shot Longitudinal Profile Measurements of Sub-Picosecond Electron Bunches**
Giel Berden (FOM Rijnhuizen, Nieuwegein)
- 10:00-10:15 **TUAOS05** 15 min **Gas-Monitor Detector for FEL Online Photon Beam Diagnostics**
Andrei Alekseevich Sorokin (PTB, Braunschweig; IOFFE, St. Petersburg)

Tuesday August 31

10:45-12:30

Location: Saturnia

FEL Technology II

Chair: Ryoichi Hajima (JAERI/FEL)

- 10:45-11:20 **TUBIS01** 35 min **Attosecond Pulses in the LCLS using the Slotted Foil Method (invited)**
Paul J Emma (SLAC, Menlo Park, California)
- 11:20-11:40 **TUBOS02** 20 min **Longitudinal Space Charge Effects in the JLAB IR FEL SRF Linac**
Carlos Hernandez-Garcia (Jefferson Lab, Newport News, Virginia)
- 11:40-12:00 **TUBOS03** 20 min **High Average Power Operation of a Scraper-Outcoupled Free Electron Laser**
Michelle D. Shinn (Jefferson Lab, Newport News, Virginia)
- 12:00-12:15 **TUBOS04** 15 min **LCLS Undulator Design Development***
Isaac Vasserman (ANL/APS, Argonne, Illinois)
- 12:15-12:30 **TUBOS05** 15 min **Commissioning of the TTF Linac Injector at the DESY VUV-FEL**
Katja Honkavaara (DESY, Hamburg)

Tuesday August 31

16:00-17:45

Location: Saturnia

FEL Oscillators

Chair: Marie-Emmanuelle Couprie (LURE)

- 16:00-16:25 **TUCOS01** 25 min **Status of the Novosibirsk Terahertz FEL**
Nikolai Aleksandrovich Vinokurov (BINP, Novosibirsk)
- 16:25-16:45 **TUCOS02** 20 min **High Power Lasing in the IR Upgrade FEL at Jefferson Lab**
Stephen Vincent Benson (Jefferson Lab, Newport News, Virginia)
- 16:45-17:05 **TUCOS03** 20 min **VUV Optics Development for the Elettra Storage Ring FEL**
Stefan Guenster (LZH, Hannover)
- 17:05-17:25 **TUCOS04** 20 min **Coherent Harmonic Generation using the ELETTRA Optical Klystron**
Giovanni De Ninno (Elettra, Basovizza, Trieste)
- 17:25-17:45 **TUCOS05** 20 min **Short Rayleigh Length Free Electron Lasers**
William Colson (NPS, Monterey, CA)

Location: Main Hall

Poster Session

10:45-17:45 **TUPOS** **FEL Technology**

Wednesday September 1

08:30-10:15

Location: Saturnia

FEL Experiments

Chair: Michelle Shinn (Jefferson Lab)

- 08:30-09:05 **WEAIS01** 35 min **Experiments on the HGHG Wavelength Tuning at the DUV FEL (invited)**
Timur Shaftan (BNL/NSLS, Upton, Long Island, New York)
- 09:05-09:30 **WEAOS02** 25 min **Spectral Phase Modulation and chirped pulse amplification in HGHG**
Brian Sheehy (BNL/NSLS, Upton, Long Island, New York)
- 09:30-09:45 **WEAOS03** 15 min **Dynamical Analysis of Chaos Generated on a Storage Ring Free Electron Laser**
Christelle Bruni (LURE, Orsay)
- 09:45-10:00 **WEAOS04** 15 min **Study of Coherence Limits and Chirp Control in Long Pulse FEL Oscillator**
Avraham Gover (University of Tel-Aviv, Tel-Aviv)
- 10:00-10:15 **WEAOS05** 15 min **Measuring the Double-Differential Spectrum of Ultra-Short SASE Radiation Pulses at VISA FEL**
Murokh Alex (UCLA/DPA, Los Angeles - California)

Wednesday September 1

10:45-12:30

Location: Saturnia

New Concepts and Ideas

Chair: Nikolai Vinokurov (BINP)

- 10:45-11:05 **WEBOS01** 20 min **Current-Enhanced SASE Using an Optical Laser and its Application to the LCLS**
William M Fawley (LBNL/CBP, Berkeley, California)
- 11:05-11:25 **WEBOS02** 20 min **Generation of Terahertz Radiation by Modulating the Electron Beam at the Cathode**
Jonathan Neumann (IREAP, College Park, Maryland)
- 11:25-11:45 **WEBOS03** 20 min **Suppression of Multipass, Multibunch Beam Breakup in Two Pass Recirculating Accelerators**
Todd I. Smith (Stanford University, Stanford, California)
- 11:45-12:05 **WEBOS04** 20 min **Potential Use of eRHIC's 10 GeV ERL for FELs and Light Source**
Vladimir Litvinenko (BNL, Upton, Long Island, New York)
- 12:05-12:25 **WEBOS05** 20 min **The Harmonically Coupled 2-Beam FEL**
Brian McNeil (Strathclyde University, Glasgow)

Thursday September 2

08:30-10:15

Location: Saturnia

Joint Session

Chair: Ingolf Lindau (Lund University)

08:30-09:05 **THAIS01** 35 min **Coherent XUV Radiation with Conventional Lasers**
(invited)

Philippe Zeitoun (LOA, Palaiseau)

09:05-09:40 **THAIS02** 35 min **SPPS: New Science on the Way to LCLS**
(invited)

Aaron M. Lindenberg (SLAC/SSRL, Menlo Park, California)

09:40-10:15 **THAIS03** 35 min **Advancing Terahertz Science and Technology with the UCSB Free-electron Lasers**
(invited)

S. James Allen (UCSB, Santa Barbara)

Thursday September 2

10:45-12:30

Location: Oceania C

Gun/Injector Technology

Chair: Tsumoru Shintake (RIKEN Spring-8 Harima)

- 10:45-11:20 **THBIC01** 35 min **Technologies for e-Beam Generation (invited)**
James Rosenzweig (UCLA, Los Angeles, California)
- 11:20-11:40 **THBOC02** 20 min **Recent Results and Perspectives of the Low Emittance Photo Injector at PITZ**
Frank Stephan (DESY Zeuthen, Zeuthen)
- 11:40-12:00 **THBOC03** 20 min **Emittance Measurement on the CeB6 Electron Gun for the SPring-8 Compact SASE Source**
Kazuaki Togawa (RIKEN Spring-8 Harima, Hyogo)
- 12:00-12:15 **THBOC04** 15 min **Ampere Average Current Photoinjector and Energy Recovery Linac**
Ilan Ben-Zvi (BNL, Upton, Long Island, New York)
- 12:15-12:30 **THBOC05** 15 min **Development of a Superconducting RF Gun in Rossendorf**
Dietmar Janssen (FZR, Dresden)

Thursday September 2

10:45-12:30

Location: Saturnia

Physical and Chemical Sciences

Chair: Norman Tolk (Vanderbilt/DPA)

- 10:45-11:10 **THBOS01** 25 min **Generation of Surface Electromagnetic Waves by Free-Electron Laser Terahertz Radiation and their Refractive Index Determination**
Guerman N. Zhizhin (RAS/STC UI, Moscow)
- 11:10-11:35 **THBOS02** 25 min **Femtosecond Laser Prevention for the Cold-Worked Stress Corrosion Crackings on Reactor Grade Low Carbon Stainless Steel**
Eisuke John Minehara (JAERI/FEL, Ibaraki-ken)
- 11:35-12:00 **THBOS03** 25 min **THz Imaging by a Wide-band Compact FEL**
Young Uk Jeong (KAERI, Daejon)
- 12:00-12:25 **THBOS04** 25 min **Present Applications of IR FEL at Peking University**
Limin Yang (PKU/IHIP, Beijing)

Thursday September 2

16:00-17:45

Location: Saturnia

Short wavelength FEL applications

Chair: Joseph Feldhaus (DESY)

- 16:00-16:35 **THCIS01** 35 min **Pump-Probe Experiments in the Gas Phase using the TTF2-FEL (invited)**
Michael Meyer (LURE, Orsay)
- 16:35-17:00 **THCOS02** 25 min **Interaction of Intense Ultrashort VUV Pulses with Different Solids – Results from the Tesla Test Facility FEL Phase I**
Jacek Krzywinski (IP PAS, Warsaw)
- 17:00-17:25 **THCOS03** 25 min **Short X-Ray Pulses Diffraction on 'Frozen' Crystals**
Souren Grigorian (RAS/CRYM, Moscow)
- 17:25-17:45 **THCOS04** 20 min **Soft X-Ray Study of Free Clusters Produced by a Pulsed Microplasma Cluster Source**
Cristina Lenardi (Università di Milano, Milano)

Location: Main Hall

Poster Session

- 10:15-17:45 **THPOS** **FEL Oscillators, FEL Experiments, New Concepts and Ideas, Users Workshop**

Friday September 3

08:30-10:15

Location: Saturnia

Biological and Medical Sciences

Chair: Charles Brau (Vanderbilt/DPA)

- 08:30-09:05 **FRAIS01** 35 min **Advances in the Physical Understanding of Laser Surgery at 6.45 microns (invited)**
Michael Shane Hutson (Vanderbilt/DPA, Nashville - Tennessee)
- 09:05-09:30 **FRAOS02** 25 min **Two-Color Mid-IR Pump-Probe Spectroscopy of Myoglobin and Corneal Stroma**
George A. Marcus (HEPL-FEL, Stanford)
- 09:30-09:55 **FRAOS03** 25 min **Picked FEL-Micro Pulse for Nano-Second Interaction with Bio-Molecules**
Sachiko Suzuki (OU-iFEL, Hirakata, Osaka)
- 09:55-10:15 **FRAOS04** 20 min **A Giant, Narrow Resonance in the Amide I Band in Proteins**
Robert Austin (PU, Princeton, New Jersey)

Friday September 3

10:45-12:15

Location: Saturnia

Closing Session

Chair: Luca Giannessi (ENEA C.R. Frascati)

- | | | | |
|-------------|----------------|--------|---|
| 10:45-11:15 | FRBIS01 | 30 min | The European X-ray Free Electron Laser Project at DESY
(invited)
Andreas Schwarz (DESY, Hamburg) |
| 11:15-11:45 | FRBIS02 | 30 min | Overview of THz Radiation Sources
(invited)
Gian Piero Gallerano (ENEA C.R. Frascati, Frascati - Roma) |
| 11:45-12:05 | FRBIS03 | 20 min | FEL Developments and Trends: A Personal Observation of FEL2004
Mike Poole (CCLRC/DL/ASTeC, Daresbury, Warrington, Cheshire) |
| 12:05-12:15 | FRBIS04 | 10 min | Closing Remarks
Richard Peter Walker (DIAMOND, Chilton, Didcot, Oxon) |