



A word from the Project Management

One and a half years after the kick-off in April 2008, IRUVX-PP, the preparatory phase of EuroFEL, is in full swing. The core activities of the future EuroFEL consortium have been determined, and significant progress has been made working out a suitable organisational structure. This work greatly benefits from active exchange with other ESFRI roadmap projects which are struggling with similar problems, and a special EU legal framework for a European Research Infrastructure Consortium (ERIC) that has become available in June 2009. Six work packages (WP1-6) take care of this “non-technical” work, while WP7 and WP8 carry out joint technical developments and associated training activities.

In October 2009 two new partners joined the IRUVX-PP consortium, INFN (IT) with the SPARX project, and PSI (CH) with the SwissFEL project. The participation of SOLEIL (FR) and possibly IPJ (PL) will be decided during the 2nd Annual Meeting in March 2010. This meeting will be an important milestone and set the course for the last year of the preparatory phase. In particular we expect that the decision makers of the partner institutions agree on the main issues of EuroFEL including the scope, the structure and the financing.

This first EuroFEL Newsletter wants to inform about the current status of its preparatory phase project and the national FEL facilities that EuroFEL intends to combine in a unique, distributed European research infrastructure for a large, multi-disciplinary user community.

We are looking forward to a very productive final period of IRUVX-PP.

Josef Feldhaus, Ute Krell and Matthias Kreuzeder

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UPCOMING IRUVX-PP EVENTS

IRUVX-PP meets Industry

Workshop, 1 March 2010

&

2nd IRUVX-PP Annual Meeting

2-5 March 2010

at Hotel Döllnsee | near Berlin

For further information please visit:
www.iruvx.eu

EuroFEL Workshop

on Photon Beamlines & Diagnostics,
28-30 June 2010,
at DESY in Hamburg

Further infos will follow soon. See:
www.iruvx.eu



The preparatory phase of EuroFEL (IRUVX-PP) is funded by the European Commission under FP7.

WP1 Construction of the EuroFEL Consortium

A draft of the consortium statutes based on the new European legal framework for consortia (ERIC) is under development. The main organs of the consortium have been defined. A draft organisational structure was set up and the counseling policy was derived taking the input from the partners into account. The provisions of the statutes are complemented by internal regulations and implementing procedures which include up to now the membership criteria, a draft management structure and rules and procedures for financial management and in-kind contributions.

WP2 User Policies

This work package has concentrated on the functional description of the access procedures and the web portal used to ensure a transparent and optimised user access to the EuroFEL facilities. In parallel, a review of the science cases of the partners' FEL facilities is prepared which will enable us to evaluate the needs of the potential EuroFEL user community; in a second step we will develop concepts to take these needs into account in the construction and operation of the EuroFEL consortium.

WP3 Coordination of Joint Technical Development

WP3 is investigating how technical developments can be effectively coordinated in the future consortium. It has identified five topical areas where joint development work will benefit the consortium. These are: FEL injector commissioning, transverse beam diagnostics, longitudinal beam diagnostics, metrology for FEL optics and photon beam transport & diagnostics. Collaborative expert groups working in each area are now organising knowledge exchange through workshops, laboratory visits and equipment sharing. WP3 and WP1 are working together to set up structures in EuroFEL which will support these collaborations and, potentially, others in the longer term.

WP4 Development of Human Resources

Coherent procedures are defined by addressing legal and administrative aspects such as: common profile descriptions and their available resources, salary ranges or mobility aspects. Moreover, a common approach to attract young people and increase the attractiveness of the laboratory will be identified. In addition, career development plans and a coordinated tenure track system to simplify the moving of careers between the facilities will be established. A joint training strategy document for review is in its final stage. Also meetings have been launched to

investigate how the exchange and training of staff can be achieved.

WP5 Communication and Dissemination

A wide-ranging communication concept is being prepared. The main issue is to determine how communication of the future consortium can work optimally. The next step is the development of a prototype website. In order to decide where it will be hosted and who will operate the site, a list of requirements has been approved and sent out to all partner IT departments who are interested in hosting the prototype website or the future EuroFEL website.

WP6 Collaborations with Industry

WP6 focuses on establishing the communication tools with industry, holding regular workshops to inform the industry about new developments and required R&D for the realisation of advanced components and systems. Moreover, the task includes identification of key industrial sectors for the construction of new FEL facilities, establishment of procurement policy as well as technology transfer between the partners and the industry and protection of Intellectual Property Rights (IPR).

WP7 Photon Beamlines and Experiments

The key issues of WP7 are photon beam diagnostics, beam transport and focusing. Significant progress has been made: New concepts for micro-structured beam splitters have been developed, surveys of various diagnostic techniques have been accomplished, and improvements in adaptive optic schemes have been achieved. Furthermore, Round Robin tests at SCSS (Japan) and LCLS (USA) with an upgraded intensity monitor and a newly developed wavefront sensors have been launched. Based on these activities and supported by WP3, a workshop series has been initiated covering special topics like metrology for optical components, wave front propagation codes, or capacity of multilayer optics. The next workshop that takes place in Hamburg end of June 2010.

WP8 FEL Source

The efforts in WP8 are currently dominated by installation and commissioning activities. While the shutdown at FLASH is used for long-term measurements and installation of improved and new devices, FERMI has intense commissioning work. But also a lot of progress on the numerous subtasks of this work package has been achieved at the other facilities as well as the preparation of the Industry Workshop on 1 March 2010.

Collaboration with ESRFUP

Like IRUVX-PP, the preparatory phase of the ESRF Upgrade Programme (ESRFUP) is an FP7-funded project of the ESFRI Roadmap. The upgrade programme will spread over 10 years and includes reconstruction of beamlines, improvement of the accelerators, instrumentation development and extensions to the experimental hall. Within the PP project, ESRFUP WP9 studied the feasibility of a generic, standard and flexible information system for managing the scientific workflow, and of a European-wide user data base of photon and neutron scientists. The overlap between this project and the IRUVX-PP WP2 (see page 2 WORK PACKAGE ACTIVITIES) soon became evident, and therefore both project teams decided to co-operate in order to avoid duplication of work. A series of meetings and workshops was held, mainly focussing on possible authentication schemes as a basis for a European-wide unique user ID and the underlying database. Currently, a test system is being set up to evaluate the costs and effort. Ultimately, such a system could pave the way for a European-wide Single Sign On (SSO) mechanism. It is our pleasure to thank D. Porte and R. Dimper of ESRF for the agreeable and fruitful collaboration. [OS](#)

Collaboration with other PP-Projects

In 2008 the ESFRI Preparatory Phase projects Coordination Committee (EPP-CC) was initiated to coordinate the exchange of experiences and common challenges between preparatory phase (PP) projects on the ESFRI roadmap. The group is chaired by Ute Krell and organised a number of workshops on legal issues and organisational and governance structures, partly together with the European Commission. Very fruitful discussions took place and helpful examples of organisational structures and statutes were presented, in particular for the new kind of distributed research infrastructures. This exchange of experience and knowledge greatly benefits the development of the EuroFEL structure. [UK](#)

FLASH reloaded

Since 21 September, the Free Electron Laser FLASH at DESY has been undergoing a substantial upgrade. During a five-month shutdown a seventh superconducting accelerator module is installed to increase the electron beam energy from 1 to 1.2 GeV, extending the wavelength range to below 5 nm. This will allow to cover the L-edges of the 3d elements using the intense 3rd harmonic of the FEL. A new 3.9-Gigahertz module that was jointly developed with Fermilab, is added just in front of the first bunch compressor in order to compensate nonlinearities and to compress the electron bunches more efficiently. Depending on the bunch charge, this unit will allow producing very short bunches in the 10 fs range, but also much longer bunches of several hundred fs as required for the seeding project (sFLASH). For this project, in collaboration with the University of Hamburg, a HHG seeded FEL section with four new undulators is added in front of the present SASE FEL including a station for high-resolution pump-probe experiments.



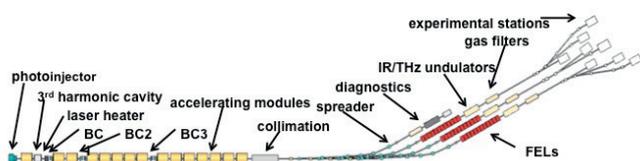
The main objective of sFLASH is to test and develop the seeding technology for a future extension of the FLASH facility. The restart of FLASH is planned for mid-February, user experiments will be resumed in summer 2010. [TZ](#)

FERMI@Elettra

FERMI@Elettra, the VUV to soft X-ray Free Electron Laser at the Sincrotrone Trieste Laboratory, is quickly coming together. The first electron beam from the photocathode RF gun has been generated and the linear accelerator is being commissioned through the laser heater region (~100 MeV). All remaining buildings, the undulator hall, the service hall, the experimental hall, and the mechanical and electrical plant buildings, are under construction with full functionality of the important electrical and mechanical plants expected in May 2010. The installation of the remaining technical equipment for the linac is ongoing and will be completed in September 2010. The installation of all transfer lines, undulators in FEL I, along with the first beamlines and experimental stations, expected to be completed in late fall of 2010, with first light occurring at the same time. FERMI will turn into an operating FEL user facility with the first user experiments scheduled for the beginning of 2011. [SM](#)

New Light Source (NLS)

The New Light Source (NLS) was conceived to provide unique insights into sub-microscopic motions in matter of all kinds. Four key science drivers governed the design: imaging nanoscale structures, capturing fluctuating and rapidly evolving systems, the study of structural dynamics underlying physical and chemical changes and ultra-fast dynamics in multi-electron systems. To achieve these goals, ultrashort pulses of intense, coherent X-rays at a high repetition rate, tightly synchronised to sources spanning THz to vacuum UV are required. This could be achieved using a combination of FELs, accelerator-based THz sources and 'conventional' lasers.



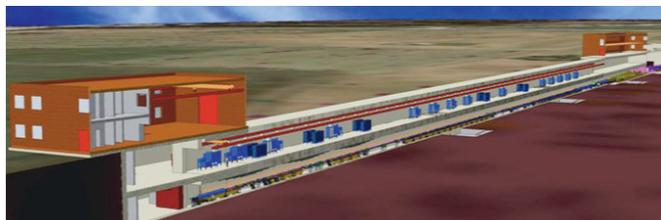
The outline design, published in July 2009 along with the updated science case, showed three FELs with different energy ranges: FEL-1 with 50-300 eV, FEL-2 with 250-850 eV and FEL-3 with 430-1000 eV, extending up to 5 keV in the higher harmonics. All three FEL tuning ranges can be achieved using variable gap undulators with a single electron energy of 2.25 GeV (see image). Superconducting technology is required for the linear accelerators to achieve the baseline frequency of 1 kHz (increasing up to 1MHz in subsequent phases). Coherent THz IR radiation from 20 – 500 μm would be generated by the electron bunches after each FEL, with conventional lasers, synchronised to the FELs, covering the range 60 meV to 50 eV. However, due to current funding constraints the project has stalled – further details are available on the NLS home page see: www.newlightsource.org MB

SwissFEL Project Overview

The SwissFEL project is progressing well, the first test facility (OBLA) is in operation and the second one (250 MeV injector) in the commissioning phase. The scientific case has been finished and will soon be available in electronic form via the PSI web page. The SwissFEL project will be presented to the "Board of Swiss Federal Institutes of Technology" at the end of 2009. It is foreseen that the project will be included in the "Guidelines of the Federal ERI policy" to be discussed at the federal parliament level during 2010-2011. By that time the technical design report of the facility will be completed. A construction period of four years is foreseen with the goal to start the commissioning of the first beam line in spring 2016. MD

SPARX-FEL

The SPARX (Sorgente Pulsata Autoamplificata di Radiazione X) FEL project is aiming at the realisation of a coherent light source of X-rays covering a wavelength range from 0.6 to 40 nm at the fundamental harmonic, and will be able to reach the Ångstrom-region using the third and fifth harmonics where high power is still produced.



Thus, it will cover a radiation region complementary to those of other facilities that are existing or under construction. The project has terminated its preparatory phase, producing a Technical Design Report, scientific case and technical drawings for the infrastructure, foreseen to be built in the south of Rome, on the campus of the university of Rome "Tor Vergata". Funding has been ensured for more than 50 % of the costs of the first phase of the project, supposed to last 4 years. With the final signature of the consortium agreement, planned in the near future, the project will start. SPARX-FEL will be the evolution of the operating SPARC test-facility, located at INFN, Frascati, that is a 500 nm SASE FEL driven by a 150 MeV high brightness photoinjector. PA

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Publisher: IRUVX-PP Project Coordinator: DESY | Notkestr. 85 | 22607 Hamburg | Germany | Contact: info@eurofel.eu | www.eurofel.eu | phone +49 40 - 89984130
 Contributors: Patrizio Antici, Marion Bowler, Mirjam van Daalen, Jan Dreyling-Eschweiler, Josef Feldhaus, Patrick Gessler, Graeme Hirst, Monika Illenseer, Ute Krell, Stephen Milton, Olaf Schwarzkopf, Vlad Skarda, Svante Svensson, Kai Tiedtke, Albin Wrulich, Thomas Zoufal (V.i.S.d.P.)
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Partners of IRUVX-PP – the preparatory phase of EuroFEL

