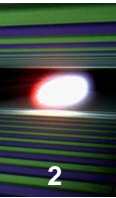
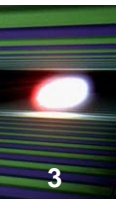


# Summary of the Workshop

Serguei L. Molodtsov

*European XFEL Project Team (EPT)  
Hamburg, Germany*





## European XFEL SCS Workshop

86 participants

## Students, PhD Students and Junior Scientists

14 bursaries

## Speakers or Participants from

14 countries

## Number of Participants from

Germany - 27  
Switzerland - 22  
Russia - 12

This Meeting forms part of a series of workshops aiming at discussion of scientific cases and designs of the European XFEL instruments.

This Workshop brings together potential users of the SCS instrument with purposes:

- to review the areas of application of the instrument
- to identify beam parameters and requirements to the experimental station(s) from the side of different experimental techniques
- to constitute user community and set user groups for close interaction with the European XFEL in developing equipment and facilities related to spectroscopies and coherent scattering experiments in the soft X-ray range of radiation

▽ Areas of scientific applications:

studies of atomic, electronic structure and dynamics of nano- and correlated systems as well as of non-reproducible biological objects were confirmed.

▽ As experimental techniques:

elastic and inelastic, resonant and non-resonant X-ray scattering and diffraction as well as photoelectron and photon correlation spectroscopies in time-resolved and -integrated modes were suggested.

▽ It was underlined that combinations of various suggested experimental techniques should be used to mostly efficiently explore the scientific areas of the SCS application.

Obviously the conclusions should be further reviewed in the light of future results from FLASH, LCLS and SCSS.

▽ **Energy range:**

for biological and magnetic experiments one needs photon energy range below 800 eV (edges of transition metals) downwards to at least 250 eV (C edge).

▽ **High energy resolution:**

is of highest important for spectroscopic experiments.

▽ **Beam size:**

obviously different beam sizes starting from 100  $\mu\text{m}$  downwards to less than 100 nm are highly desirable. A possibility to tune beam size in one experiment was requested.

▽ **Pulse duration:**

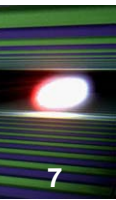
~10 fs or less is a must to probe dynamics of electron system.

▽ **Repetition rate:**

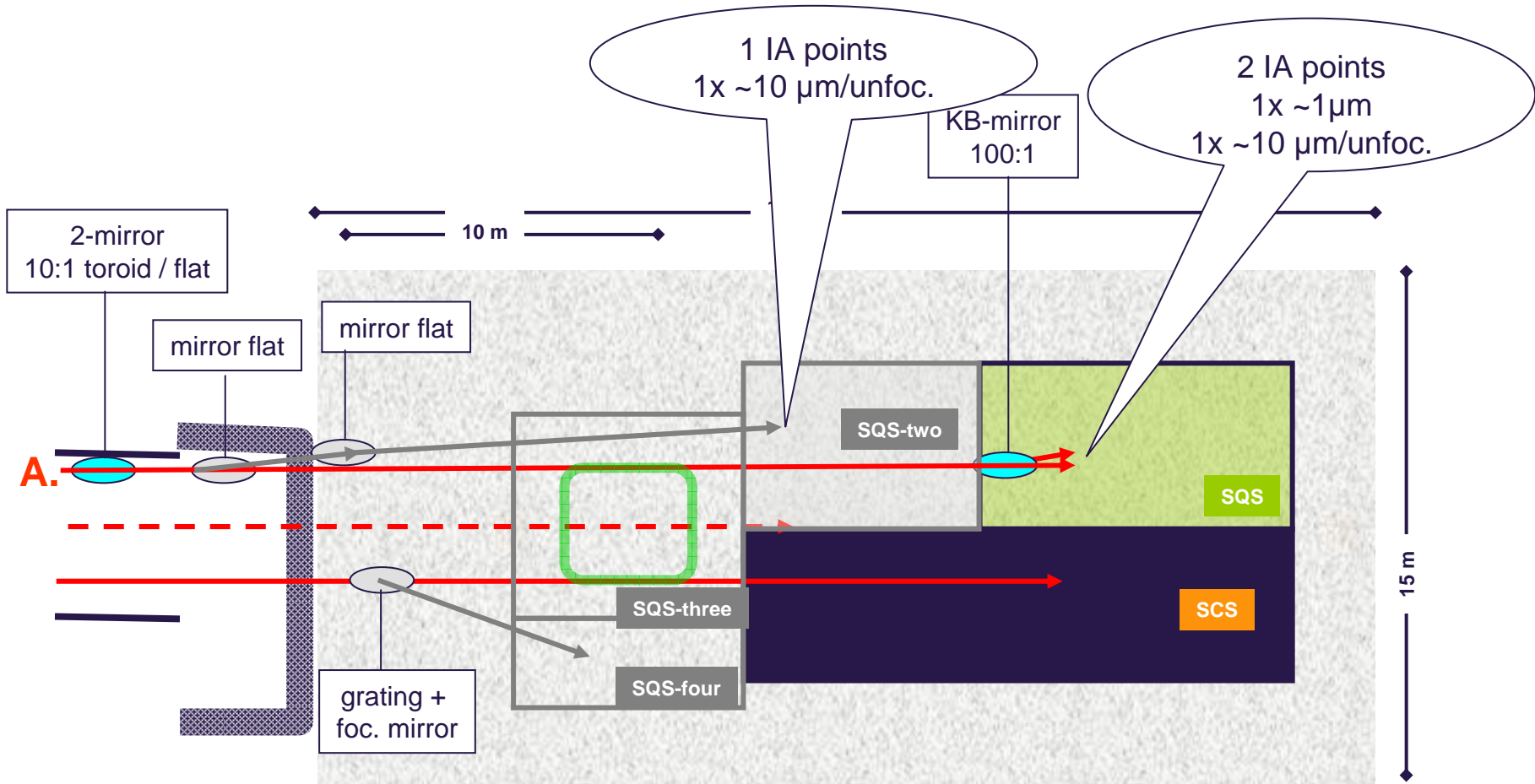
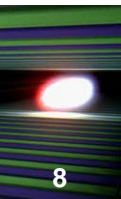
although a number of experiments can be done with ~10 Hz rep. rate, much higher rep. rates (1-5 MHz) are necessary for PES studies and investigations of dilute samples.

▽ **Light polarization:**

circular light polarization is necessary for studies of magnetic samples and symmetry properties of other samples.



- ▽ Spatial separation of instruments using photon beam with/without monochromatization was confirmed.
- ▽ Spectroscopic community is going to use only the branch with monochromator.
- ▽ Separate endstations are necessary for different WGs. Thereby the users are aware that to compliment basic configurations provided by European XFEL they should purchase themselves missing equipment.
- ▽ Free ports to mount equipment brought by users should be foreseen.





- ▽ User community for the SCS instrument is established. The European XFEL will provide some infrastructure like website and will closely interact in organizing meeting, workshops, *etc.*
  
- ▽ To follow up the WG discussions the communities should work out some of the remaining technical issues.
  
- ▽ Points of contacts:
  - search for the leading scientist for the SCS instrument will be started soon;
  - S. Molodtsov on the management side.

- Jun, 09** Workshop in Villigen, rough concept of the SCS instrument, formation of user community.
- end 09** Conceptual design of the SASE 3 beam transport system.
- end 10** Technical design of the SASE 3 beam transport system. Conceptual design of the SCS instrument.
- end 11** Technical design of the SCS instrument.
- end 13** The SASE 3 beam transport system and the SCS instrument are ready for installation.
- 2014** Initial beam and pilot experiments.
- 2015** Full operation.

European XFEL International workshop on the Spectroscopy and Coherent Scattering Endstation and associated instrumentation at the European XFEL

02 – 04 June 2009  
Paul Scherrer Institut  
Villigen, Switzerland

**Local organizers**  
Rafael Abela, Bruce Patterson  
Paul Scherrer Institut, Villigen, Switzerland

**International programme committee**  
Rafael Abela, Paul Scherrer Institut, Villigen, Switzerland  
Henry Chapman, CFEL, Hamburg, Germany  
Gyula Faigel, Research Institute for Solid State Physics and Optics, Budapest, Hungary  
Gerhard Gruebel, DESY, Hamburg, Germany  
Zahid Hussain, ALS, Berkeley, USA  
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Mikhail Kovalchuk, Kurchatov Institute, Moscow, Russia  
Jan Luning, University of Paris VI, France  
Nils Martensson, MAX-Lab, Lund, Sweden  
Serguei Molodtsov, European XFEL Project Team, Hamburg, Germany  
Wilfried Wurth, University of Hamburg, Germany

The Spectroscopy and Coherent Scattering (SCS) Instrument is intended for the investigation of atomic and electronic structure as well as of the dynamics of soft and hard matter, biological species and magnetic materials. Areas of application are material sciences, structural and cell biology, nano-materials and dynamics of condensed matter. Experiments utilizing elastic, resonant inelastic and magnetic scattering of soft X-rays as well as photoelectron emission and photon correlation spectroscopy are going to be performed at this instrument.

This meeting forms part of a series of workshops aiming at the discussion of scientific cases and designs of the European XFEL instruments. It will feature a number of invited lectures presenting scientific and technical views, followed by group sessions providing opportunities for extended discussions from broad user communities on the construction of the SCS Instrument and its capabilities.

Young scientists bursaries  
Deadline 04 May 2009  
(for details see website)

[www.xfel.eu/ecs-workshop-2009](http://www.xfel.eu/ecs-workshop-2009)  
Registration deadline  
04 May 2009

The workshop is co-funded by the European Commission through the Pre-XFEL grant. This will allow free of charge access to the workshop.

Hosting the workshop and support by the Paul Scherrer Institut, Villigen, Switzerland, is gratefully acknowledged.

**Local contact**  
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We thank the Organizes:

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Bruce Patterson

Mirjam van Daalen

Silvia Bacher

H. Schori

*Paul Scherrer Institut, Villigen*

Imke Gembalies

*European XFEL, Hamburg*

Gyula Faigel

*Institute for Solid State Physics  
and Optics, Budapest*

All participants contributing to  
the scope of the SCS Workshop

The Workshop was supported by  
Pre-XFEL grant within EP7 of the  
European Commission



**WG I:** Photon-in/Photon-out & Photon-in/Electron-out  
Spectroscopic Experiments  
*(Chairs W. Wurth & Z. Hussain)*

**WG II:** Imaging, Dynamics & Photon Correlation Spectroscopy:  
Biological Objects  
*(Chairs I. Schlichting & I. Vartaniants)*

**WG III:** Imaging, Dynamics & Photon Correlation Spectroscopy:  
Magnetic Systems  
*(Chairs G. Grübel & J. Luning)*

We expect that during their sessions the WGs will:

- identify scientific cases for the research at the SCS endstation(s)
- provide requirements on SASE 3 generation, beam delivery and SCS instrumentation
- constitute the SCS user community(ies) and plan their further actions.

After the Workshop the WGs submit brief reports summarizing WG discussions, suggested instrumentation and proposed activities to establish missing instrumentation.

# EPT team wish WGs fruitful and conclusive discussions

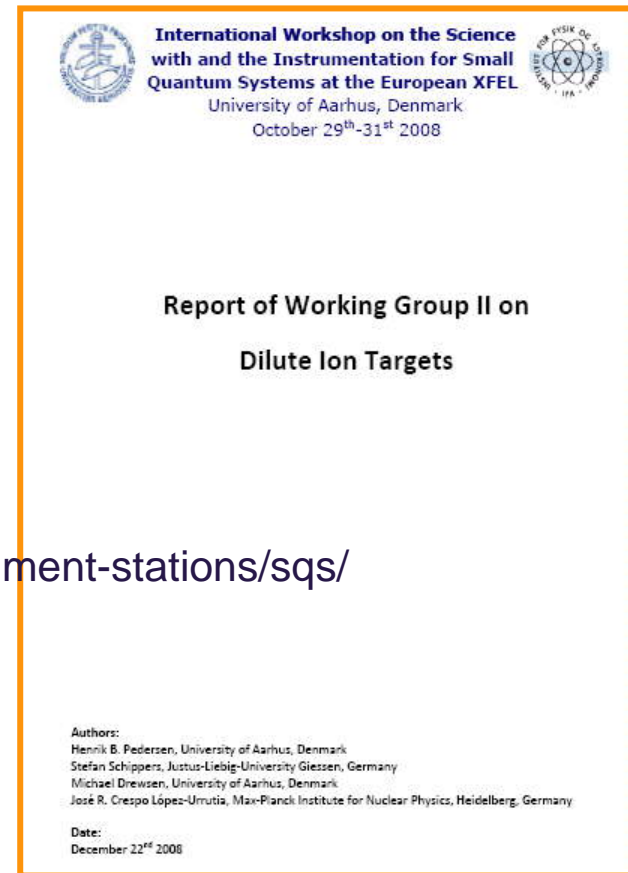





**International Workshop on the Science with and the Instrumentation for Small Quantum Systems at the European XFEL**
  
 University of Aarhus, Denmark  
 October 29<sup>th</sup>-31<sup>st</sup> 2008

**Report of Working Group I on Gas Phase Instrumentation**

**Authors:**  
 Michael Meyer, LIXAM/CNRS, Centre Universitaire Paris-Sud, Orsay, France  
 Thomas Möller, Institut für Optik und Atomare Physik, TU Berlin, Germany

**Date:**  
 December 12<sup>th</sup> 2008




**International Workshop on the Science with and the Instrumentation for Small Quantum Systems at the European XFEL**
  
 University of Aarhus, Denmark  
 October 29<sup>th</sup>-31<sup>st</sup> 2008

**Report of Working Group II on Dilute Ion Targets**

**Authors:**  
 Henrik B. Pedersen, University of Aarhus, Denmark  
 Stefan Schippers, Justus-Liebig-University Giessen, Germany  
 Michael Drewsen, University of Aarhus, Denmark  
 José R. Crespo López-Urrutia, Max-Planck Institute for Nuclear Physics, Heidelberg, Germany

**Date:**  
 December 22<sup>nd</sup> 2008

[www.xfel.eu/en/experiment-stations/sqs/](http://www.xfel.eu/en/experiment-stations/sqs/)