# SQS Status Report

**Bldg. 28c, FLASH SR | (Afternoon session 2)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker</th>
<th>Institution</th>
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<tbody>
<tr>
<td>14:00 – 14:25</td>
<td>KB focusing optics</td>
<td>T. Mazza</td>
<td>XFEL</td>
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<tr>
<td>14:25 – 14:50</td>
<td>AQS &amp; day-one instrumentation</td>
<td>A. DeFanis</td>
<td>XFEL</td>
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<td>14:50 – 15:15</td>
<td>1D-imaging XUV spectrometer</td>
<td>J.E. Rubensson</td>
<td>Uppsala</td>
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<td>15:15 – 15:40</td>
<td>FEL diagnostics &amp; SQS control system</td>
<td>T. Baumann</td>
<td>XFEL</td>
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<td>15:40 – 16:10</td>
<td>Coffee break</td>
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<td>16:10 – 16:35</td>
<td>NQS &amp; day-one instrumentation</td>
<td>Y. Ovcharenko</td>
<td>XFEL</td>
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<td>16:35</td>
<td>REMI</td>
<td>M. Schöffler</td>
<td>U Frankfurt</td>
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<td>17:00</td>
<td>Instrument Laser &amp; timing diagnostics</td>
<td>P. Grychtol</td>
<td>XFEL</td>
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<td>17:25</td>
<td>Schedule, early user workshop, Discussion/Closeout</td>
<td>M. Meyer</td>
<td>XFEL</td>
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SASE3 Performances

<table>
<thead>
<tr>
<th>SASE3</th>
<th>$h\nu = 250 - 3000 \text{ eV}$</th>
<th>$P = 0.2 - 11.0 \text{ mJ}$</th>
<th>Lin./Circ. Pol.</th>
</tr>
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<tbody>
<tr>
<td>$\Delta T = 2 - 100 \text{ fs}$</td>
<td>Coherence: 0.96</td>
<td>Split &amp; Delay</td>
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Non-linear phenomena
$10^{17} - 10^{18} \text{ W / cm}^2$

Time-resolved studies
low jitter (<10 fs)

Imaging experiments
Spatial coherence

European XFEL

High repetition rate:
$< 27000 \text{ pulses/ sec}$

High data collection rate
Multi-particle coincidences
General Layout of SQS Scientific Instrument

**AQS: Atomic-like Quantum Systems**
- Targets: atoms & molecules
- Detection: electrons, ions, photons
- eTOFs: High energy resolution
- VMI: Non-dipole studies
- MBES: Angular distribution
- e / ion - coincidences
- 1D Imaging XUV spectrometer

**NQS: Nano-size Quantum Systems**
- Targets: Cluster, Nano-particles, bio-molecules
- Detection: electrons, ions, photons
- DSSC 2D imaging: Diffraction patterns
- ionTOF: Mass spectra
- VMI: Angular distribution
- eTOF: High energy resolution

**KB Optics**
- Bendable mirrors
- 3 interaction points
- ≤ 1 micron focus
- variable focus size

**REMI: Reaction Microscope**
- Targets: molecules
- Detection: electrons, ions
- Angle- and energy-resolved electron and ion spectra in coincidence

**Timing Diagnostics**

**Beam Dump**
AQS Chamber

- eTOF  
  eTOF1 tested
  eTOF2 & 3 production started

- VMI  
  prototype tested

- MBES  
  (in-kind: R. Feifel, U. Göteborg); delivery end of 2017

- XUV spectrometer  
  (in-kind: J.-E. Rubensson, Uppsala); delivery end of 2017

- Molecular beam  
  ready

- COMO  
  (user consortium: J. Küpper, XFEL); delivery end of 2017
NQS Chamber

- VMI ready end of 2017
- iTOF ready end of 2017
- DSSC delivery in 2018
- MCP stack ready end of 2017

User contributions

- Rare gas cluster sources T. Möller, TU Berlin
- Metal cluster source P. Piseri, U. Milano
- Scienta analyser K.-H. Meiwes Broer, U. Rostock
- Thomson Parabola E. Rühl, FU Berlin
- Fluorescence spectrometer A. Ehresmann, U. Kassel
REMI (R. Dörner, Uni. Frankfurt)

- Chamber tested
- REMI delivery Autumn 2017

KB focussing optics

- Vacuum chamber installation > September 2017
- KB mirror delivery December 2017
- First SQS commissioning (plan B) > January 2018
- KB mirror installation > July 2018
SQS Installation schedule

<table>
<thead>
<tr>
<th>2017</th>
<th>2018</th>
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<tbody>
<tr>
<td>Q1</td>
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<td>Q2</td>
<td>Q2</td>
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<tr>
<td>Q3</td>
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<td>Q4</td>
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- **Assembly & Testing**
- **Installation**
- **Operation with BEAM**

- **Diagnostics**
- **Commissioning**
- **User Operation**

- Hutch ready (July ‘17)
- Infrastructure ready (Sep ‘17)
- Hutch operational (Nov ‘17)
- First beam possible (> Jan ‘18)
PP-laser installation schedule

General PP-laser installation schedule:

- **Task 1:** Laser tables and infrastructure in PP and ILH-hutches
- **Task 2:** Components + commissioning in PP and ILH-hutches
- **Task 3:** Beam to experiment for day-1

SASE-specific schedules:

<table>
<thead>
<tr>
<th>Year</th>
<th>Jul 2016</th>
<th>Dec 2016</th>
<th>Jan 2017</th>
<th>Dec 2017</th>
<th>Jan 2018</th>
<th>Dec 2018</th>
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<td>SASE1</td>
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<td>SASE2</td>
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SQS meetings and workshops

- SQS: 1D Imaging XUV spectrometer  
  May 5th, 2017

- SQS: AQS meeting  
  Summer 2017

- SQS: Pump-Probe meeting  
  Autumn 2017

SQS and SCS User Operation Workshop:

September 2017

Visit of European XFEL facility in Schenefeld

Wednesday, January 25th, 2017, 15h30
SQS commissioning

- Commissioning starts in beginning 2018
  - High intensities (tight focus)
  - Time-resolved studies (optical laser)
  - Diffraction (scattering detector)

- Commissioning of components largely driven by user proposals

- Day-one operation with reduced parameters for FEL
  - Not full bunch charge
  - Not full repetition rate
  - Not full photon energy range
SQS Summary

- What topics did we miss?
- What topic should get special consideration?
- Feedback highly welcome
- Your FIRST experiment

Questions?  Comments?