## Laser and Plasma Accelerator Workshop 2011 Program

### Workshop Opening and Lightning Round Talks (June 20-21)

#### Monday (June 20)

**8:00 Opening Remarks (Jie Zhang)**

#### Session 1, Chair: C. S. Liu

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:15-8:45</td>
<td>Chan Joshi (UCLA)</td>
<td>Electron and Ion Acceleration Work at UCLA</td>
</tr>
<tr>
<td>8:45-9:15</td>
<td>Victor Malka (LOA)</td>
<td>Laser Plasma Accelerators at LOA</td>
</tr>
<tr>
<td>9:15-9:45</td>
<td>Mike Downer (UT Austin)</td>
<td>Recent Progress of Laser Plasma Accelerator at UT Austin</td>
</tr>
<tr>
<td>9:45-10:15</td>
<td>Wei Gai (ANL)</td>
<td>Recent Experimental Results at Argonne Wakefield Accelerator and Its Future Plan</td>
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#### Break

#### Session 2, Chair: T. Katsouleas

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>10:45-11:15</td>
<td>Patric Muggli (MPI)</td>
<td>A Proton Driven Wakefield Experiment at CERN</td>
</tr>
<tr>
<td>11:15-11:45</td>
<td>M.D. Litos (SLAC)</td>
<td>Early Results from Plasma Wakefield Experiments at FACET</td>
</tr>
<tr>
<td>11:45-12:15</td>
<td>Stefan Karsch (MPQ)</td>
<td>LWFA at MPQ: Overview of Recent Results</td>
</tr>
</tbody>
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#### Lunch break

#### Session 3, Chair: R. Bingham

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>13:30-14:00</td>
<td>G. H. Welsh (U.Strathclyde)</td>
<td>High Resolution Electron Beam Measurements on the ALPHA-X Laser Plasma Wakefield Accelerator</td>
</tr>
<tr>
<td>14:00-14:30</td>
<td>K. Nakamura (LBNL)</td>
<td>Overview of the Recent Progress in Laser Plasma Accelerator Experiments at LOASIS Program</td>
</tr>
<tr>
<td>14:30-15:00</td>
<td>A.G.R. Thomas (U. Michigan)</td>
<td>Recent Experiments and Simulation Results in Laser Wakefield Acceleration from the University of Michigan</td>
</tr>
<tr>
<td>15:00-15:30</td>
<td>Z. Najmudin (IC, UK)</td>
<td>Recent Progress of Laser Plasma Acceleration at Imperial College</td>
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</table>

#### Break

#### Session 4, Chair: K. Nakajima

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>16:00-16:30</td>
<td>R. A. Fonceca (IST)</td>
<td>Recent Progress of Large Scale Plasma Simulation at IST and UCLA</td>
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<tr>
<td>Time</td>
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<tr>
<td>16:30-17:00</td>
<td>V. Yakimenko (BNL)</td>
<td>Experimental Program at Accelerator Test Facility</td>
</tr>
<tr>
<td>17:00-17:30</td>
<td>B. Cros (LPGR, France)</td>
<td>Electron Beams and X-ray Radiation Generated by Laser Wakefield in Capillary Tubes</td>
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<td><strong>Dinner</strong></td>
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**Tuesday (June 21)**

**Session 5, Chair: Z.M. Sheng**

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<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>8:30-9:00</td>
<td>Y. T. Li (IOP, Beijing)</td>
<td>Studies of Secondary Sources Driven by Intense Laser Pulses at the Institute of Physics, CAS</td>
</tr>
<tr>
<td>9:00-9:30</td>
<td>R.X. Li (SIOM, Shanghai)</td>
<td>Recent Progress of Laser Plasma Acceleration at SIOM</td>
</tr>
<tr>
<td>9:30-10:00</td>
<td>Y.Q. Gu (LFRC, Mianyang)</td>
<td>Recent Progress of Laser Plasma Acceleration at LFRC</td>
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<td><strong>Break</strong></td>
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**Session 6, Chair: W. Lu**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>10:30-11:00</td>
<td>U. Schramm (HZDR)</td>
<td>Dose Controlled Radiobiological Experiments with Ultra-short Pulse Laser Accelerated Proton Pulses</td>
</tr>
<tr>
<td>11:00-11:30</td>
<td>B.M. Heglich (LANL)</td>
<td>Particle Acceleration in the Transparent Overdense Regime of Plasma Physics</td>
</tr>
<tr>
<td>11:30-12:30</td>
<td><strong>Introduction of Working Groups 1, 2, 3, 4 by the working group leaders</strong></td>
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<td></td>
<td><strong>Lunch break</strong></td>
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**Working group talks, posters, John Dawson Thesis Prize Awarding Ceremony**

**Working groups talks (see additional programs)**

**Tuesday afternoon (June 21) – Thursday afternoon (June 23)**

**Poster Session I**: June 21, Tuesday, 16:00-17:30

**John Dawson Thesis Prize Awarding Ceremony**: Tuesday 17:30-18:30

Co-Chaired by Chan Joshi and Victor Malka

**Poster Session II**: June 23, Thursday, 14:00-15:30
## Working Group 1: Laser Plasma Electron Acceleration

Working Group Leaders: Stefan Karch (MPQ), Alec Thomas (U. Michigan), Stefan Kneip (IC, UK)

### Wednesday

#### Session 1: DIAGNOSTICS

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:30-8:50</td>
<td>Zhengyan Li</td>
<td>Frequency-Domain Tomography for Ultrafast Imaging of Evolving Laser–Plasma Accelerator Structures</td>
</tr>
<tr>
<td>8:50-9:10</td>
<td>S.I. Bajekov</td>
<td>Coherent Transition Radiation as a Temporal and Transverse Electron Bunch Profile Diagnostic</td>
</tr>
<tr>
<td>9:10-9:30</td>
<td>A. Buck</td>
<td>Real-Time Observation of Laser-Driven Electron Acceleration</td>
</tr>
<tr>
<td>9:30-9:50</td>
<td>Dong-Gyu Jang</td>
<td>The Electron Densities Measurements of the Hydrogen-Filled Capillary Plasma by Using the Interferometric and Spectroscopic Method</td>
</tr>
<tr>
<td>9:50-10:10</td>
<td>Discussions</td>
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### Wednesday

#### Session 2: PROGRESS in LWFA

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<tr>
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<tbody>
<tr>
<td>10:30-10:50</td>
<td>X. Wang</td>
<td>Self-Injected Petawatt Laser-driven Plasma Electron Acceleration in $10^{17}\text{ cm}^{-3}$ Plasma</td>
</tr>
<tr>
<td>10:50-11:10</td>
<td>Antonia Popp</td>
<td>Evolution of Electron-bunch Parameters During Laser Wakefield Acceleration</td>
</tr>
<tr>
<td>11:10-11:30</td>
<td>J.F. Hua</td>
<td>A Versatile Experimental Facility for Plasma Based Accelerator Research at Tsinghua University</td>
</tr>
<tr>
<td>11:50-12:10</td>
<td>Kazuhisa Nakajima</td>
<td>Large-Scale Laser-Plasma Accelerators Toward High-Energy Frontier</td>
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<tr>
<td>12:10-12:25</td>
<td>Discussions</td>
<td></td>
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### Thursday

#### Session 3: INJECTION

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>10:30-10:50</td>
<td>W. Lu</td>
<td>Self and Controlled Injection in Multi-dimensional Wakefield Driven by Lasers or Charged Particle Beams</td>
</tr>
<tr>
<td>10:50-11:10</td>
<td>A. Irman</td>
<td>A Preliminary Study of Ionization In Laser wakefield acceleration with the 150 TW DRACO laser</td>
</tr>
<tr>
<td>11:10-11:30</td>
<td>Y. Y. Ma</td>
<td>Electron Bow-wave Injection Regime in Laser Wakefield Acceleration</td>
</tr>
<tr>
<td>11:30-11:50</td>
<td>Chunmei Wang</td>
<td>Shock-Wave Based Density Downramp for Electron Injection</td>
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<tr>
<td>Time</td>
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<td>Topic</td>
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<tr>
<td>11:50-12:10</td>
<td>H.C. Wu</td>
<td>Electron Injection and Acceleration Improved by Shaped Dense Plasma Wall (tube) in the Blowout (bubble) Regime</td>
</tr>
<tr>
<td>12:10-12:25</td>
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<td>Discussions</td>
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**Thursday**

**Session 4: TECHNIQUES**

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<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Topic</th>
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<tbody>
<tr>
<td>16:00-16:20</td>
<td>S.M. Wiggins</td>
<td>Linearly Tapered Capillaries</td>
</tr>
<tr>
<td>16:20-16:40</td>
<td>Xiaofang Wang</td>
<td>Propagation of a High-Intensity Laser Pulse in Gas-Target Plasma</td>
</tr>
<tr>
<td>16:40-17:00</td>
<td>N.E. Andreev</td>
<td>Electron Bunch Compression and Acceleration in Laser Wake Fields</td>
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<tr>
<td>17:00-17:30</td>
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<td>Discussions and Summary</td>
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**Friday**

<table>
<thead>
<tr>
<th>Time</th>
<th></th>
<th>Summary Report (Stefan Karch, Alec Thomas, Stefan Kneip)</th>
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</thead>
</table>
Working Group 2: Radiation Generation and Application
Working Group Leaders: Mark Wiggins (U. Strathclyde), Liming Chen (IOP, CAS)

Discussion Topics
a) betatron X-ray sources
b) gamma-ray sources (betatron, Thomson scattering, bremsstrahlung, etc)
c) undulator and FEL sources
d) optical, infra-red and THz sources
e) applications

We are interested in laser-based radiation sources of all kinds and this Working Group comprises a mixture of source mechanisms (e.g. betatron oscillation, FEL) and radiation types produced (e.g. X-rays, THz). Overriding everything are applications of the photon beams, bearing in mind that our community’s objective, in this regard, is to provide useful radiation sources to user groups (e.g. biologists, chemists).

We will aim to appreciate the progress in the field of radiation generation since LPAW09 and identify goals and challenges for the next two years.

| Tuesday |
|-------------------|-------------------|----------------------------------|
| **Session 1: X-ray/gamma-ray sources from LWFA electron beams** |
| 14:00-14:20 S. Kneip | Betatron X-rays as Wakefield Diagnostic and Radiation Source |
| 14:20-14:40 C. Thaury | A New Diagnostic for Mapping the Betatron X-ray Radiation in Laser-Plasma Accelerators |
| 14:40-15:00 M. Wiggins | Towards a Tunable X-ray/γ-ray Betatron Source from Laser Wakefield Accelerators |
| 15:00-15:20 Y. Gu | High-charge Energetic Electron Bunch Generation for γ-ray Radiography |
| 15:20-15:40 | Discussions |

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<p>| Thursday |
|-------------------|-------------------|----------------------------------|
| <strong>Session 2: Various radiation Sources and techniques</strong> |
| 8:30-8:50 M. S. Hur | Laser Pulse Shaping in an Overdense Plasma and the Generation of an Electron Mirror |
| 8:50-9:10 M. Wen | Monochromatic High Frequency Pulse Generated from Few-cycle Laser Driven Thomson Backscattering |
| 9:10-9:30 L. X. Yan | Experimental Study on THz Production Based on Ultrashort Electron Bunch |</p>
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**Thursday**

**Session 3:**

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<tbody>
<tr>
<td>10:30-10:50</td>
<td>V. Yakimenko</td>
<td>CO₂ Laser Based Undulator for A Compact SASE FEL</td>
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<tr>
<td>10:50-11:10</td>
<td>J. Zhou</td>
<td>Laser Acceleration using a Micro Accelerator Platform for Application as Radiation Sources</td>
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<tr>
<td>11:10-11:30</td>
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<td>Discussions</td>
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**Thursday**

**Session 4:**

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<tbody>
<tr>
<td>16:00-16:20</td>
<td>J. Farmer</td>
<td>Raman Amplification in Plasma: a Laser Source for Wakefield Acceleration</td>
</tr>
<tr>
<td>16:20-16:40</td>
<td>D. B. Zou</td>
<td>A Simple Model to Achieve Laser Pulse Trapping and Amplifying in the Interaction with a Thin Foil and a Solid Target</td>
</tr>
<tr>
<td>16:40-17:00</td>
<td>L. Chen</td>
<td>Ultra-short Intense Laser Driven K-shell X-ray Source for Imaging</td>
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<tr>
<td>17:00-17:30</td>
<td></td>
<td>Discussions</td>
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<tr>
<td>17:30-18:30</td>
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<td>Summary Preparation (Mark Wiggins &amp; Liming Chen)</td>
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<td>8:30-10:30</td>
<td></td>
<td>Summary Report (Mark Wiggins &amp; Liming Chen)</td>
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</tbody>
</table>
Working Group 3: Laser Driven Ion Acceleration
Working Group Leaders: Ulrich Schramm (HZDR) and Z.M. Sheng (SJTU)

Discussion Topics
a) Radiation pressure acceleration theory and experiments
b) Target normal sheath acceleration scaling from theory and experiments
c) Other schemes of ion acceleration and physics

Laser driven ion acceleration from various physical mechanisms will be discussed in the Working Group 3, which includes the radiation pressure acceleration under different laser and plasma parameter conditions, target normal sheath acceleration and improved schemes, collisionless electrostatic shock waves, injection into laser wakefields and RF waves for further acceleration. Key issues of laser driven ion acceleration aiming at potential applications will be discussed.

<table>
<thead>
<tr>
<th>Wednesday</th>
<th>RPA and TNSA theory and experiments</th>
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<tbody>
<tr>
<td>8:30-8:50</td>
<td>Baifei Shen</td>
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<td>8:50-9:10</td>
<td>Z. Najmudin</td>
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<td>9:10-9:30</td>
<td>F. Dollar</td>
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<td>9:30-9:50</td>
<td>P. Antici</td>
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<tr>
<td>9:50-10:10</td>
<td>K. Zeil</td>
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<tr>
<th>Wednesday</th>
<th>Other schemes of laser driven ion acceleration and physics</th>
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<tr>
<td>10:30-10:50</td>
<td>Quan-Li Dong</td>
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<td>10:50-11:10</td>
<td>A. Flacco</td>
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<td>11:10-11:30</td>
<td>Weimin Zhou</td>
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<tr>
<th>Thursday</th>
<th>Discussion and Summary (U. Schramm and Z.M. Sheng)</th>
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## Working Group 4: Plasma Wakefield Acceleration & Computational Methods

Working Group Leaders: Patric Muggli (MPI), K.V. Lotov (NSU, Russia), M. Tzoufras (UCLA)

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<tr>
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<tbody>
<tr>
<td><strong>Session 1: Plasma Wakefield Acceleration</strong></td>
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<tr>
<td>14:00-14:20</td>
<td>B. Hidding</td>
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<tr>
<td>14:20-14:40</td>
<td>K. Lotov</td>
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<tr>
<td>14:40-15:00</td>
<td>P. Muggli</td>
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<tr>
<td>15:00-15:20</td>
<td>J. Vieira</td>
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<tr>
<td>15:20-15:40</td>
<td>N. A. M. Hafz</td>
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<tr>
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<tbody>
<tr>
<td><strong>Session 2: Computational Methods</strong></td>
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<tr>
<td>8:30-8:50</td>
<td>B. M. Cowan</td>
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<tr>
<td>8:50-9:10</td>
<td>M. Tzoufras</td>
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<tr>
<td>9:50-10:10</td>
<td>M. Tzoufras</td>
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