

Summary of Accelerator Session A

Source and Beam manipulation

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Session Program

Accelerator Session A: FEL technology - Source and Beam manipulation I (session chair: Hitoshi Tanaka, SACLA), Room 201, 2-nd floor of Administration Building

- 14:00 (20') **Injector R&D Program at LCLS (John Schmerge, SLAC)**
- 14:20 (20') **LCLS Injector emittance optimization (Feng Zhou, SLAC)**
- 14:40 (20') **Development of C-band 2/3 pi-mode CG acceleration structures (Yuji Otake, SACLA)**
- 15:00 (20') **Dechirper experience at LCLS (Alberto Lutman, SLAC)**
- 15:20 (30') **Coffee Break**

FEL technology - Source and Beam manipulation II (session chair: Florian Loehl, PSI)

- 15:50 (20') **Performances of PAL-XFEL diagnostics system (Changbum Kim, PAL)**
- 16:10 (20') **Overview of collaborations for beam diagnostics with PSI involvement (Nicole Hiller, PSI)**
- 16:30 (20') **X-band deflectors for electron pulse length diagnostics (Yuantao Ding, SLAC)**
- 16:50 (20') **X-band solid-state amplifier development (Hoon Heo, PAL)**
- 17:10 (20') **XLEAP-Attosecond pulse manipulation, Jerry Hastings, SLAC**
- 17:30 (30') **Open discussion**

Abstract of Each Presentation (1)

- John Schmerge (SLAC) reported a new injector R&D plan at NLCTA , targeting a slice emittance of 0.1 μm with a charge of 200pC for two years from 2017~2018.
- Following this, Feng Zhou (SLAC) showed a possibility of LCLS injector emittance reduction using (1) laser pulse shaping, (2) longer laser pulse, (3) transversal profile shaping with circular collimator, and (4) on-line emittance reduction by optimization algorithm, i.e., simplex method.

Abstract of Each Presentation (2)

- Yuji Otake (SACLA) presented design details and achieved performance of the developed C-band CG accelerator structure. Motivation is to achieve higher gradient with lower cost compared to the current choke-mode type C-band structure.
- Alberto Lutman (SLAC) reported an innovative concept using a dechirper, in which a dechirper works as a beam twister. Combining with a sophisticated orbit correction, an arbitrary slice of electron bunch is separately lased or processed for various applications.

Abstract of Each Presentation (3)

- Changbum Kim (PAL) presented an excellent overview of the PAL XFEL diagnostic system.
- Nicole Hiller (PSI) reported Diagnostics Collaborations with PSI Involvement showing tighter connections among European countries.
- Yuanta Ding (SLAC) reported progress of XTCAV with recent application highlights. With an RF pulse compressor, the time resolution could be improved a factor of two.
- Hoon Heo (PAL) clearly presented design details and achieved performance of the developed X-band solid state amplifier.

Abstract of Each Presentation (4)

- Jerry Hastings (SLAC) presented a new scheme generating brighter sub-fs FEL. The scheme uses an IR high power laser(2ps) as a seeder and it generates a sub-fs spike on the electron bunch by compressing the modulated beam with a small chicane. The XLEAP project was officially approved and a proof-of-principle experiment is under preparation.

Summary (1)

1. An E-gun and a injector have still a room for improvements to access higher XFEL performance, i.e., higher intensity and shorter XFEL wavelengths. Therefore, this would be a promising collaboration item.
2. Hardware developments(C-band Acc. structure and X-band SSA presented in this session) have common useful knowledge and sub-components, so all facilities can partially or potentially share their achievements and experiences.

Summary (2)

3. A compact and high resolution ($<1\text{fs}$) longitudinal diagnostic system is a critically important tool for upgrading the XFEL performance. Development of Such a diagnostics system may be difficult but a good collaboration item.
4. New innovative ideas are always promising collaborative subjects.

Thanks to all the presenters and participants, we fully enjoyed hot and useful discussions in Accelerator Session A.

Thank you for your valuable contributions.