

エクストリームフォトリクスセミナー

Extreme Photonics Seminar

No. 9

Date: Nov. 25(Fri), 2011, 15:00 ~ 17:00
Location: Cooperation Center, 5F Meeting Room, W524
(研究交流棟5階会議室 W524)

Language: English

Title: New Frontiers in Ultrafast Semiconductor Lasers

Speaker: Dr. Martin Hoffmann (ETH Zürich)

Semiconductor laser have the potential to reduce complexity and cost of high power ultrafast laser significantly. Passively modelocking with SESAMs enabled 2.1 W average power, sub-100 fs pulse duration, and up to 50 GHz repetition rate. In 2007, the successful integration of the absorber in the gain structure was demonstrated in form of the MIXSEL.

However, high power operation in the femtosecond regime has not been demonstrated. Here, we present the first demonstration of high power (>1 W) femtosecond operation from VECSELS. Furthermore, the latest results from a MIXSEL, SESAM optimization and an electrical pumping scheme for VECSELS will be presented.

Language: Japanese

Title: Advanced laser technologies for high-brightness photocathode electron gun

Speaker: Dr. Hiromitsu Tomizawa (JASRI / XFEL Division)

A laser-excited photocathode RF gun is one of the most reliable high-brightness electron beam sources for XFELs. Several 3D laser shaping methods have been developed as ideal photocathode illumination sources at SPring-8 since 2001. To suppress the emittance growth caused by nonlinear space-charge forces, the 3D cylindrical UV-pulse was optimized spatially as a flattop and temporally as squarely stacked chirped pulses.

This shaping system is a serial combination of a deformable mirror that adaptively shapes the spatial profile with a metaheuristic algorithm and a UV-pulse stacker that consists of four birefringent Alpha-BBO crystal rods for temporal shaping. Using this 3D-shaped pulse, a normalized emittance of $1.4 \pi \text{ mm mrad}$ was obtained in 2006. Utilizing laser's Z-polarization, Schottky-effect-gated photocathode gun was proposed in 2006. The cathode work functions are reduced by a laser-induced Schottky effect. Generating Z-polarization, a radial polarized laser is focused with a hollow lens in vacuum.

Language: Japanese

Title: Advanced Accelerators for Future Light Sources

Speaker: Dr. Takahiro Watanabe (JASRI / SPring-8)

One of major applications of particles accelerators is to generate high brilliance photon beams for a wide variety of sciences and industries. The race to develop future light sources for higher brilliance photon beam generation has been intensive these years. The x-ray free electron lasers are developed in the US, EU, and Japan, while new storage rings (SR) have been successively constructed over the world. Energy recovery linac (ERL) is also being studied especially in the US and Japan. Although in all the schemes the photon beams are generated when electrons pass through a periodic structure of magnet, called an undulator, the characteristics of generated photon beams are notably different with each other. For instance, the FEL is supposed to be able to generate longitudinally coherent X-ray under a specific condition, while the SR light is most likely incoherent in longitudinal axis while it is intrinsically stable and the repetition rate is high. In the seminar, fundamental principles of accelerator-based light sources and current status of the development race are overviewed.

連絡先: 高強度軟X線アト秒パルス研究チーム 高橋(8533)

Contact: E. Takahashi(ext.8533) Intense Attosec. Pulse Res. Team