FELs of Europe 2nd Topical Workshop on Selected Problems in FEL Physics: "From Soft X-rays to THz" and Satellite Workshop "Perspectives and Future Challenges in Optical and RF Synchronization Systems"

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Type: not specified

The Fermi synchronization of Seed and pump-probe Lasers: achieved performance and recent developments.

Tuesday 14 November 2023 14:00 (20 minutes)

The seed laser of FERMI generates the UV pulses that seed the FEL and the IR pulses delivered to the beamlines for pump-probe experiments. The implemented tight synchronization of the local laser oscillator to the optical timing system and the stabilization of the time of flight across the regenerative amplifier secure better then 5 fs RMS jitter of the seed pulses with respect to the timing reference. In the pump-probe experiments the timing jitter is also typically better then 5fs RMS over tens of minutes.

In order to maintain the proper timing between the seed laser pulse and the electron bunch we compensate the delay of the UV pulses during the wavelength changes caused by the optical parametric amplifier timing and an additional feedback system correlates the BAMs with the FEL intensity, adjusting the seed laser arrival time in order to compensate drifts due to e-beam and UV beam transport drifts. The talk will present details on the updated optical setups, including the upgrade for implementing the EEHG scheme where 2 seed pulses delivered to different locations need to be provided.

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Session Classification: Satellite Workshop