

Development of phase locked oscillator FEL for high repetition mid-infrared frequency combs

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The mid-Infrared region (2-5 μm) is currently a frontier of laser science with short durations, where many molecular absorbing spectrums exist. The oscillator free electron lasers have advantages against solid-state laser systems, that include the fundamental generations of high-intensity mid-IR pulses with femto-seconds scale short duration, continuous variations of the central wavelength, and the high-repetitions of pulses due to RF accelerations of electron bunches. Especially, the coexistence of high-intensities and high-repetitions at GHz scales is important for the development of mid-IR frequency combs that may open up a new direction of molecule nonlinear reactions. In this presentation, we report on the importance of phase-locking between FEL pulses that grow up independently due to shot noises for the mid-IR frequency combs, and the states of development of a test phase-locking system, and introduce possible applications of the mid-IR frequency combs.

Footnotes

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