

ELPH seminar

Speaker: Asst. Prof. Dr. Sakhorn Rimjaem

Date : October 25th (TUE) 15:00-16:00

Place : Mikamine Hall, ELPH

Title : Development of an Accelerator-based Infrared Free-electron Laser Facility at Chiang Mai University in Thailand

Abstract :

An accelerator-based infrared free-electron laser facility is under the development at the PBP-CMU Electron Linac Laboratory (PCELL) in Chiang Mai University. This facility will be the first of its kind in Thailand and Southeast Asia, which aims to provide experimental stations for users utilizing coherent terahertz (THz) and mid-infrared (MIR) radiation. The accelerator system and radiation stations consist mainly of a thermionic-cathode RF gun, an alpha magnet as a bunch compressor and energy filter, a travelling-wave RF linac, two magnetic bunch compressors, a THz transition radiation (THz TR) station, and two beamlines for MIR/THz FEL. Simulation results suggest that the oscillator MIR FEL with wavelengths of 9.5-16.6 μm and pulse energies of 0.15-0.4 μJ can be produced from 60-pC electron bunches with energy of 20-25 MeV. The super-radiant THz FEL in form of coherent undulator radiation with frequencies of 1-3 THz and a peak power of up to 700 kW can be generated from 10-16 MeV electron bunches with a charge of 50 pC and a bunch length of 200-

300 fs. Owing to the ability of producing femtosecond electron bunches, the coherent THz TR with a spectral range of 0.3-2.5 THz and a pulse power of up to 1.5 MW can also be achieved. Currently, development and installation of components in the MIR and THz FEL beamlines are on-going. In parallel, development of user stations using THz time-domain spectroscopy and MIR/THz-FEL pump-probe experiment is planned. In this talk, introduction to the facility overview and progress of its development will be presented.