

# Study of Undulator Radiation from Femtosecond Electron Bunches

*Wednesday 20 May 2015 14:00 (3h 30m)*

Linac based terahertz (THz) source at the Plasma and Beam Physics (PBP) Research Facility, Chiang Mai University, consists of a thermionic RF electron gun, an alpha magnet for magnetic bunch compressor, a travelling wave s-band accelerating structure for post acceleration, and various beam diagnostic instruments. The PBP-CMU linac can produce relativistic femtosecond electron bunches, which are used to generate coherent THz radiation via transition radiation technique. To increase the radiation intensity, an electromagnetic undulator will be added in the beam transport line. The existed electromagnetic undulator at the PBP research facility have a period length of 55 mm with an undulator parameter of approximately 1 or equivalents to a peak magnetic field of around 0.2 T. Numerical calculation result shows that the brightness of the undulator radiation, which is produced from electron bunches with an energy of 10 MeV, a peak current of 300 A, and an effective bunch length of 120 fs, is  $10^5$  times higher than the brightness of the transition radiation. This study investigates the dependence of the electron beam energy, electron bunch charge, and electron bunch length on the undulator radiation. The numerical simulation and procedure to generate the undulator radiation in the terahertz regime by using femtosecond electron bunches produced at the PBP research facility is reported and discussed in this contribution.

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**Session Classification:** Poster-1

**Track Classification:** Accelerators and Synchrotron Radiations