



Contribution ID: 424

Type: Invited talk

Development of superradiant THz sources at NSRRC

Thursday 29 August 2024 11:40 (20 minutes)

Linac-based coherent THz radiation sources are being developed with the NSRRC high brightness photoinjector which has been installed in the Accelerator Test Area (ATA). The injector is equipped with a laser-driven photocathode rf gun and a 5.2-m long S-band traveling-wave linac for beam acceleration. A sub-picosecond electron bunch with 27-MeV beam energy has been produced from this injector by the so-called velocity bunching technique. Intense narrow-band superradiant THz radiation with tunable central frequency from 0.6 to 1.5 THz can be generated by injecting such ultrashort beam into a U100 planar undulator. The other broadband THz coherent transition radiation (CTR) generated by passing this beam through a metallic foil is used for measuring the bunch length by autocorrelation technique. Currently the electron bunch length is measured to be 240 fs with the field gradient 13.8 MV/m. Improvement of better beam quality of this photo-injector and construction of the THz user facility are under consideration.

I plan to submit also conference proceedings

Yes

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Session Classification: Mikrosymposium 6/3: FELs: New facilities and Opportunities

Track Classification: 6. FELs: New facilities and opportunities