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Improvement of NSRRC superradiant THz FEL

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National Synchrotron Radiation Research Center (NSRRC) has been advancing its capabilities in producing intense terahertz (THz) radiation from a superradiant free-electron laser (FEL). This system utilizes a photoinjector operating in its velocity bunching mode to achieve ultra-short electron bunches. However, the highest THz frequency from the facility is determined by the shortest achievable bunch duration. Currently, the highest THz frequency is limited to 1.4 THz, corresponding to the shortest attainable bunch duration of 240 fsec from the photoinjector. To enable higher THz frequency operation, the NSRRC team is investigating the implementation of a dogleg beamline for enhanced bunch duration. Using the PUFFIN code, we have calculated the superradiant THz undulator radiation achievable with these compressed bunches. The results demonstrate the potential to produce intense 3 THz radiation, marking a substantial enhancement in the frequency range and intensity of the THz FEL output.

Footnotes

Paper preparation format

Word

Region represented

Asia

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