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Electron Bunch Width Limitations on the Spectrum of the Coherent Synchrotron Emission from Ultrathin Foils[1] NICHOLAS FASANO, Princeton University, MATTHEW EDWARDS, Princeton Univrsity, JULIA MIKHAILOVA, Princeton University — High-order harmonic generation from the interaction of intense lasers with solid targets offers a compact solution for generating brilliant and broadband extreme-ultraviolet and soft x-ray radiation. Detailed numerical simulations and theoretical work have revealed the origin of this radiation to be from the sub-cycle bunching and acceleration of electrons, which undergo synchrotron-like trajectories, emitting bursts of attosecond pulsed radiation. The use of ultra-thin targets, as opposed to thick targets, has been shown to result in higher conversion efficiencies. In this ultra-thin foil regime, attosecond pulses are emitted in both the specular and transmitted directions. In this work, we use particle-in-cell simulations to investigate the effects of the electron bunch width on the spectral power-law and attosecond pulse formation, in particular, showing how the measured bunch width limits the efficiency of the emission process.

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