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## Particle-in-Cell Modeling of Coherent Inverse Compton Scattering

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A pathway to a compact accelerator-based short-wavelength light source consists of scattering a high-power laser pulse off relativistic bright electron beams thereby producing frequency up-shifted photons. This inverse Compton scattering (ICS) process has formed the backbone of gamma- and X-ray-generation at several facilities. In the present paper, we investigate the onset of coherent ICS (CICS) where the electron coherently participates through the interaction resulting in a significant enhancement of the photon flux. We specifically explore via particle-in-cell simulation the generation of coherent X-rays from pre-bunched electron beams as recently proposed and explore possible beam shaping to enhance the interactions.

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