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## Simulation of novel high-quality radiation sources for industrial use

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Recent simulation and experimental results have demonstrated that hard x-ray sources (>1 MeV) from laser-plasma wakefield accelerated (LWFA) electrons can generate a small source x-ray source for radiography. Other laser-plasma x-rays sources have been shown to be of a high enough quality to demonstrate phase contrast imaging (PCI). This project aims at bringing together these two important results.

In order to fully understand the injection and acceleration of the electrons, the generation of the photon source and the potential for imaging, a large range of time and spatial scales must be simulated. Hydro, particle-in-cell, Monte-Carlo and ray tracing codes each provide part of the solution to this simulation challenge.

We present start-to-end modeling demonstrating the feasibility of x-ray imaging at high photon energy, high resolution and high signal to noise.

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