MATTER AND TECHNOLOGIES

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Fourier propagators as synthetic diagnostics in PIConGPU

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We present a synthetic Shadowgraphy Plugin for the particle-in-cell code PIConGPU. By time-integrating electric and magnetic fields and propagating them onto a screen in the far field with Fourier methods, shadowgram images equivalent to experimental measurements can be produced.

Our in-situ plugin now enables recording few-cycle probe pulses after they traverse plasma structures of e.g. laser-plasma accelerators with the PIC algorithm. The so generated images contain the full laser-plasma interactions in contrast to traditional post-processing approaches. By analyzing these shadowgrams alongside the 3D, time-resolved density distribution from the simulation, one can trace the origin of specific features.

We also show validation tests, that confirm the conservation of physical quantities and the plugin performing as expected. This allows to quantitatively predict and analyze shadowgrams.

Speed talk:

Normal speed talk selection

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