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## Improving the Reproducibility of LWFA Experiments with Particle-In-Cell Simulations

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We present studies on improving the quantitative reproducibility of laser-wakefield acceleration experiments conducted at LMU with particle-in-cell simulations. The evolution of a simulation is sensitive to numerical instabilities or artifacts and the correct description of the laser pulse and the plasma, whereas usually their profiles are oversimplified to basic analytic functions. We study the influence and scaling of simulations to numerical artifacts which mainly heat the plasma particles or cause incorrect dispersion and result in increased trapping of particles in the wakefield. These effects scale with different kinds of resolution parameters and the type of solver. Furthermore, we study the scaling with basic plasma and laser parameters such as the pulse energy and plasma density, and the influence of using experimentally measured laser and plasma profiles. This is an ongoing study, and we expect to be able to present the final results at the workshop.

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