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Full PIC simulation of first ACHIP experiment @ SINBAD

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In laser illuminated dieelectric accelerators (DLA) high acceleration gradients can be achieved, due to high damage thresholds of the materials at optical frequencies. This is a necessity in developing more compact particle accelerator technologies. The Accelerator on a CHip International Program funded by the Gordon and Betty Moore Foundation is researching such devices. DESY Hamburgs ARD group under Ralph Aßmann is part of the collaboration. The dedicated accelerator research facility SINBAD under construction is particulary well suited for DLA experiments at relativistic electron energies, due to the high quality beams und short bunch lengths anticipated.
In this study the results of the first conductable experiment at the facility are estimated via a combination of particle-in-cell (PIC) and tracking simulations. It will be an acceleration experiment with a bunch from the ARES linac. Astra is used to simulate an electron bunch at a suitable working point. The dielectric part of the setup will be simulated using the PIC code from CST Particle Studio incorporating the retrieved bunch from the ASTRA simulation. The energy spectra of the electron bunches are calculated as would be measured from a spectrometer dipole with and without the laser fields.

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