

The data here is used in the publication 'Surface Plasmon-Driven Electron and Proton Acceleration without Grating Coupling'. 2D Particle in Cell simulations (PIC) using the open-source PIC code EPOCH (<https://github.com/Warwick-Plasma/epoch>) were performed. It was compiled with gcc-9.3.0 and openmpi-4.0.4. The input files for EPOCH used to create the simulation data have been included in this folder where the folder name describes the 'target' geometry and the files inside provide a parametric scan of laser and target conditions. These files are in deck format which is just a text file containing the input parameters for the simulations. These files can be read and edited with any text editor but is used for the EPOCH PIC code. Details on how to use these files to recreate the simulation results can be found at <https://github.com/Warwick-Plasma/epoch>.

The simulations were done for grazing incidence and parallel incidence of the pulse to the target surface as discussed in the paper. The input files are arranged in different sub folders inside two main folders 'grazing_incidence' and 'parallel_incidence' as described below –

The folder 'grazing_incidence/angle_scan' contains the input files for the simulations with different laser incidence angle α (angle between the laser and the target surface) at a laser intensity of $3.4 \times 10^{19} W/cm^2$ used in figure 2. Here the filename is the incidence angle α . Keeping $\alpha = 5^\circ$ another set of simulations were done by varying the intensity as shown in figure 4. The input files for these simulations are in the folder 'grazing_incidence/intensity_scan' where the filename is the peak intensity.

The folder 'parallel_incidence' contains input files for two sets of simulations for parallel incidence of the laser with a certain amount of focal spot shift from the target midplane (δ) for two different intensities. The folder 'parallel_incidence/lowintensity' contains the input files for these simulations with laser intensity $3.4 \times 10^{19} W/cm^2$ used in figure 6 of the paper, and the input files for the simulations with a higher laser intensity $6 \times 10^{20} W/cm^2$ used in figure 8 are contained in the folder 'parallel_incidence/highintensity'. For both the instances the filename is given by the peak intensity together with the amount of focal spot shift in micrometer. For example, for the laser intensity $3.4 \times 10^{19} W/cm^2$ and for a focal spot shift of $3\mu m$, the filename is given by '3p4E19_3.deck'.