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Low Energy Bunch Compression With Dogleg Chicane

The ESCULAP project joins the photo injector PHIL with the High Power Laser LASERIX to perform a laser plasma wakefield acceleration (LPA) experiment. A prerequisite is that the electron beam (10pC,10MeV) has to be compressed longitudinally before being injected in the plasma cell from 2000fs (RMS) to less than 300fs (and later 100fs). To achieve such compression we present a solution based on a dogleg chicane. The design of this chicane uses the simulation codes ASTRA and ELEGANT. Effects such as longitudinal space charge and coherent synchrotron radiation are taken into account. We show that when achieving this compression, the emittance in the x direction grows from 0.4mm.mrad to 0.84mm.mrad due to higher order chromacity.

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