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Implementation of novel acceleration functionality in BDSIM

Tuesday 3 June 2025 16:00 (2 hours)

Beam Delivery Simulation (BDSIM) is a Geant4 based accelerator tracking code which includes interactions of particles with material. BDSIM has become an important code in the accelerator community to simulate beam lines. Since laser and beam driven plasma wakefield acceleration (LWFA/PWFA) is a promising acceleration method we found it important to include related capability in BDSIM. This requires the addition of new beamline elements that are commonly used in plasma acceleration experiments. A gas volume where the LWFA/PWFA takes place and a beam mask to create a separate drive beam and a witness beam. In the former, the beam interacts with gas so ideal gas calculations are required to input the gas properties. Biasing can specifically be applied to the gas material in those elements. Simulating the interactions between the beam and a plasma is not done in BDSIM. An external software is used to compute the fields and the particles data. BDSIM can now read the output HDF5 files to reconstruct the fields inside the gas capillary or use the particle data as a bunch definition for the beginning of a beamline. Some results explaining how to make a LWFA/PWFA simulation are presented.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

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