

Design of a beam transport line for external injection of plasma wakefield acceleration experiments based on BEPCII

Monday 26 August 2024 16:00 (2 hours)

Laser wakefield accelerator (LWFA) and plasma wakefield acceleration (PWFA) have attracted a wealth of research interests since they can provide an accelerating gradient of ~ 100 GV/m. Recently, a series of LWFA/PWFA external injection experiments are foreseen to be carried out based on the linear accelerator (LINAC) of Beijing Electron-Positron Collider II (BEPCII). We hereby present a design of the beam transport line from the BEPCII LINAC to the LWFA/PWFA experimental chamber. The constraint of the existing building and beamline of the BEPCII was considered carefully in the design. The performance of the transport line is evaluated using the particle tracking simulations, demonstrating that the bunch length of the electrons with energy of 2 GeV and charge of 2 nC can be compressed from 10 ps to 1 ps (RMS), and the beam spot size is focused from about $850\text{ }\mu\text{m}$ to $116\text{ }\mu\text{m}$ (RMS).

Footnotes

Funding Agency

Primary author: SHI, Xueyan (Chinese Academy of Sciences)

Co-authors: WANG, Yiwei (Chinese Academy of Sciences); XU, Haisheng (Institute of High Energy Physics); LI, Dazhang (Chinese Academy of Sciences); MA, Ande (Chinese Academy of Sciences)

Presenter: SHI, Xueyan (Chinese Academy of Sciences)

Session Classification: Monday Poster Session

Track Classification: MC1: Beam Dynamics, Extreme Beams, Sources and Beam-Related Technologies; MC1.1 Beam Dynamics, beam simulations, beam transport