

An External Injected Drive-witness Bunch Pair Merge System with Femtosecond Timescale Jitter

Wednesday, 23 October 2024 21:03 (1 minute)

Beam-driven plasma-wakefield accelerator (PWFA) transform the energy from the leading drive bunch to a trailing witness bunch. The separation of the two bunches is in the order of 100 fs. In order to obtain high transformer ratio and long-distance acceleration PWFA, we need to precisely control the separation of the drive and witness bunch. We propose a new scheme to merge two electron bunch within an ultra-short distance. The two-electron beam with different energy can be merge by one common dipole. However, energy jitter could cause time jitter for the separation between the two bunches. In order to suppress the time jitter, we designed a high order isochronous merge system, in which the separation time jitter caused by energy jitter can be limited to femtosecond timescales. Besides, we take control of the coherent synchrotron radiation (CSR), which can affect both time jitter in the longitudinal phase space and emittance growth in the transverse phase space.

Primary authors: MENG, Cai (高能所); 李, 为 (中国科学院高能物理研究所)

Presenter: 李, 为 (中国科学院高能物理研究所)

Session Classification: Poster

Track Classification: Accelerator: 01: Global & beam dynamics