

Study on the Dynamics during Longitudinal Compression of Intense Charged Particle Beams with Compact Simulator

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Heavy ion beams are expected to be potential drivers for high-energy density physics and heavy ion inertial fusion. For the heavy ion inertial fusion, we need to increase the beam power more than TW level by the acceleration and the bunch compression. Processes of longitudinal beam manipulation and bunch compression are essential to increase the beam power particularly at the final stage of the accelerator. However, in the compression stage, space-charge effects may degrade the beam focus-ability seriously.

When the beam bunch is modulated quasi-statically, such as the beam bunching in conventional RF accelerator, emittance growth should be suppressed at a minimum level. In contrast, in the stage of final bunching, a dynamical space-charge effect may induce significant emittance growth. Furthermore, the beam coupling in transverse and longitudinal directions by the space charge effect may cause unpredictable emittance growth during the final bunching. So we intend to investigate the space-charge induced dissipation processes using a compact simulator.

We have made a compact bunching simulator based on electron beams. The device consists of an electron gun

We compare influence factors for the compression ratios and discuss the condition for the evaluation of dy

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