Contribution ID: **70** Type: **Invited talk**

Study on Beam Dynamics during Longitudinal Bunch Compression using Compact Simulator Supported by Theoretical and Numerical Approaches for Heavy Ion Fusion

Thursday 16 August 2012 10:00 (20 minutes)

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In final beam bunch compression for heavy ion-beam driven inertial confinement fusion (ICF), i.e., heavy ion fusion (HIF), the beam dynamics with theoretical and numerical simulation approaches to investigate the limitation of longitudinal pulse compression is studied in comparison with experimental results. Transport of space-charge-dominated beams with low emittance is crucial issue for application to HIF [1-2]. However, the beam dynamics is unclear, because the beam parameters are extraordinary in comparison with the particle beams produced from conventional accelerators. It is important to clear the dynamics for the precise control of high-current beams due to effective fuel pellet implosion. Although, the beam parameters depend on the stage and the accelerator complex for HIF, high current (1 kA~100 kA) heavy ion beams are required in the final stage of the particle accelerator system.

A compact simulator with an electron beam was constructed to understand the beam dynamics during the final
Using the longitudinal envelope equation, the ratio between the repulsion forces due to the space charge a

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