

ACCELERATOR SEMINAR

“Overview of Studies of Microbunching Instability”

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Microbunching instability is a physical process when the initial longitudinal density modulation in an electron bunch induces energy modulation through collective interaction, such as the longitudinal space charge or coherent synchrotron radiation (CSR). This energy modulation is further converted to larger density modulation through momentum compaction of the lattice, causing amplification of the initial modulation. This process is often parasitic to the generation or transport of high brightness beams, and can compromise diagnostics by coherent optical transition radiation (COTR) or degrade the FEL performance in the downstream undulator. In this seminar, we'll review the important works on the observation of microbunching instability, and the theory and simulation using impedance results based on 1D bunch model. We will then present recent progress in microbunching studies based on more refined models of longitudinal space charge and CSR, and highlight the mitigation method and possible application of the instability in accelerator designs.

**Thursday, June 27, 2013
11:00 a.m.
CEBAF Center, Room F113**