Effect of Energy Spread on the BBU Instability Threshold in Case of Off-Crest Acceleration

First Step: Stable Orbit Analysis with 2-ps Bunch Length

CERL 8.2 lattice with a single HOM in each of the six cavities in the final cryostat of the north linac

Jim Crittenden

Cornell Laboratory for Accelerator-Based Sciences and Education
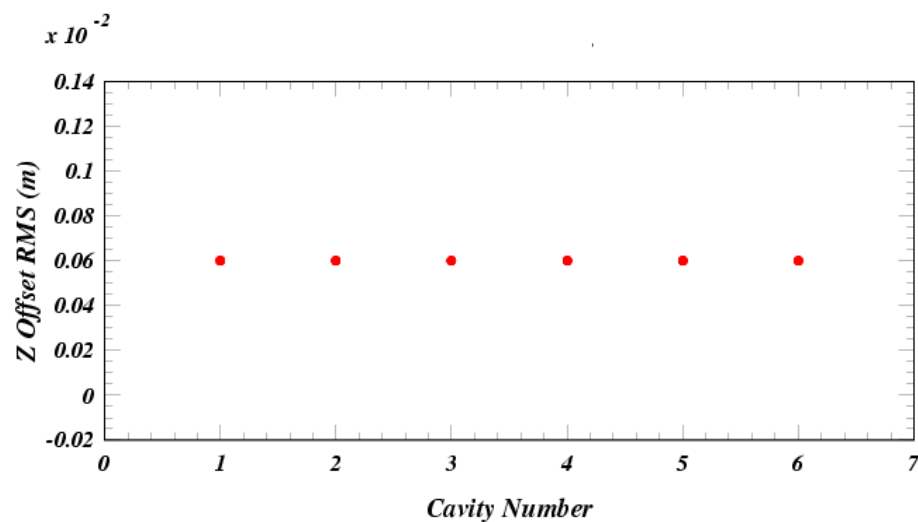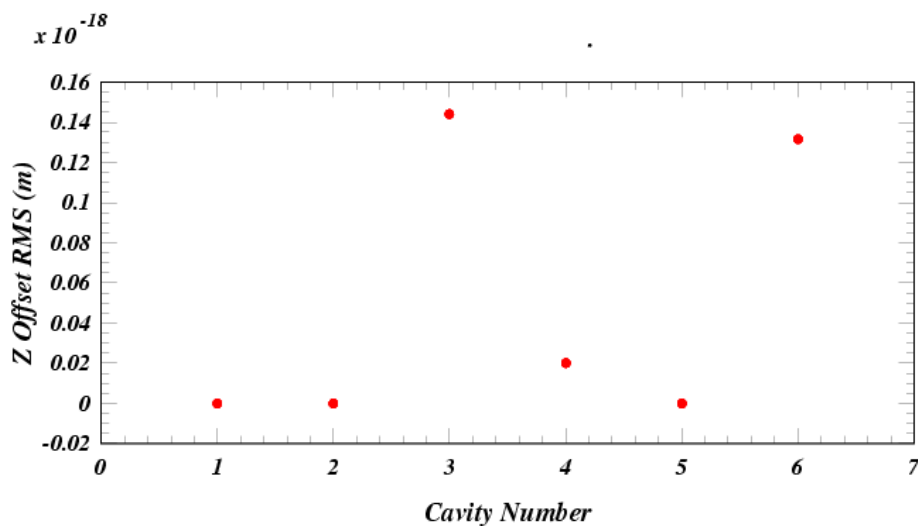
ERL@CESR Meeting

10 November 2011

Cornell University
Laboratory for Elementary-Particle Physics

Initialize beam with 2-ps bunch length and ten particles/bunch. On-crest acceleration.

σ_z = 0 mm

σ_z = 0.6 mm

Verify bunch length

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Laboratory for Elementary-Particle Physics

Initialize beam with 2-ps bunch length and ten particles/bunch. On-crest acceleration.

$\sigma_z = 0$ mm	$\sigma_z = 0.6$ mm

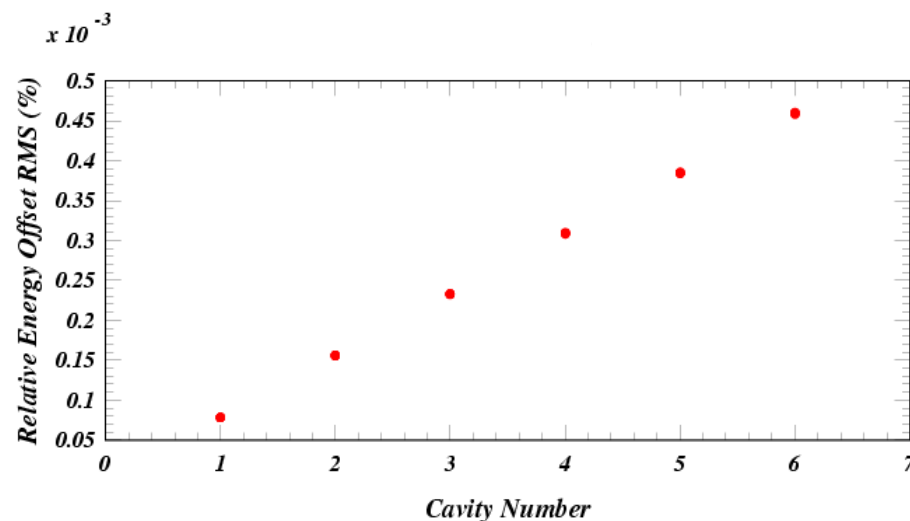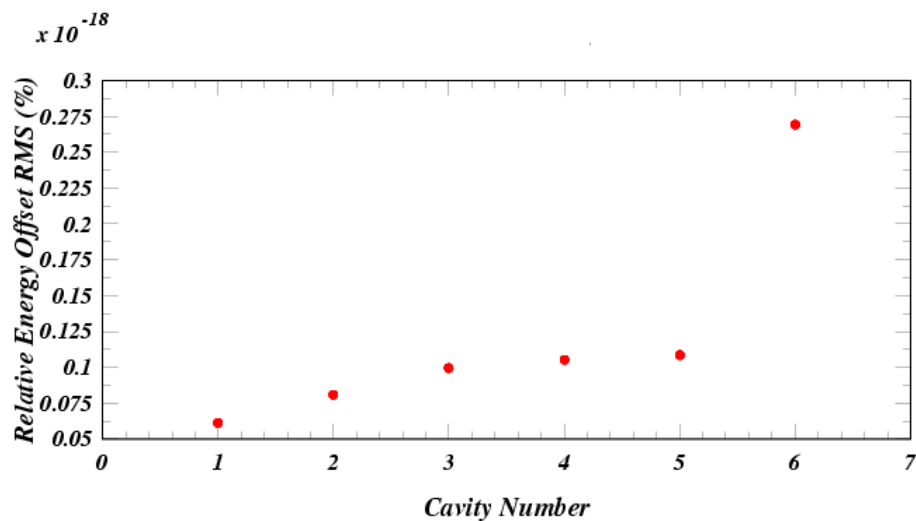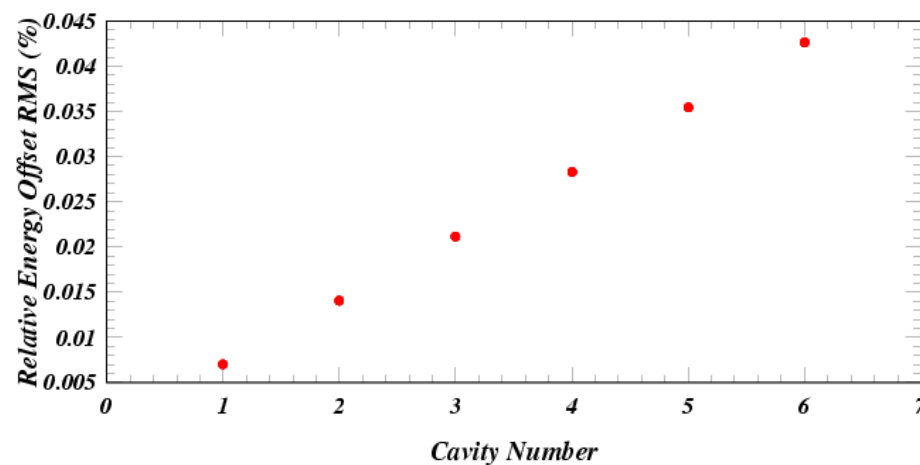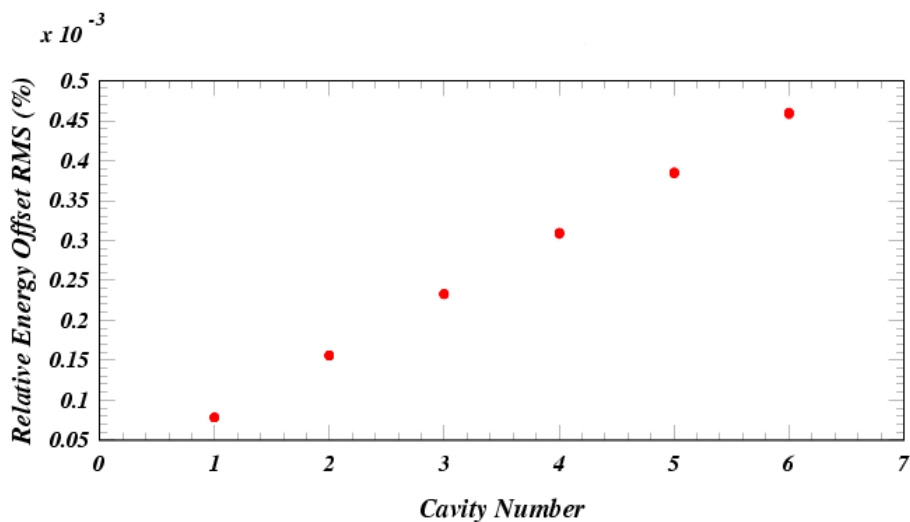**Bunch length induces energy spread increasing along linac up to 5e-4 %.**

On-crest

Off-crest

Energy spread increases by a factor of 100.