

Modelled Electron Cloud Trapping Dependence on Quadrupole Field Strength and Positron Bunch Population

Kellie Olear and Jim Crittenden Electron Cloud/Impedance Meeting 8 June 2015







Cornell University Laboratory for Elementary-Particle Physics

Definition of trapped density (see today's talk by JPS)



This is the example published in Phys Rev ST AB 18, 041001 (2015). 20-bunch trains, 16-ns spacing, 8.0 mA/bunch (12.8e10 e+/bunch). Trapping fraction given as "about 7%" without the clearing bunch.



Cloud density threshold behavior (see Electron Cloud Meeting talk on 20 Aug 2014)



Increasing the bunch current by 33% produces an order of magnitude increase in the total cloud density. The fluctuations in trapping fraction at low density are related to numerical approximations used to limit CPU time.



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Cloud density threshold behavior Zoom in on the 9th train



The high cloud density is caused by the cloud self-sustaining itself during the interbunch time intervals.

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Dependence of the trapping fraction on quadrupole strength and bunch population

Saturated density in the 10th train





Surprise! The trapped density fraction decreases with field strength. Needs investigation.

At what field strength is the trapping maximized? Do the regions of high trapped cloud density vary with field strength?

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