



Cornell University
Laboratory for Elementary-Particle Physics



Comparison of ECLLOUD Calculations in Dipole and Quadrupole Fields (reprise)

Cloud buildup over a full CESR turn (2.5 μ sec, 183 bunches)

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Electron Cloud Meeting

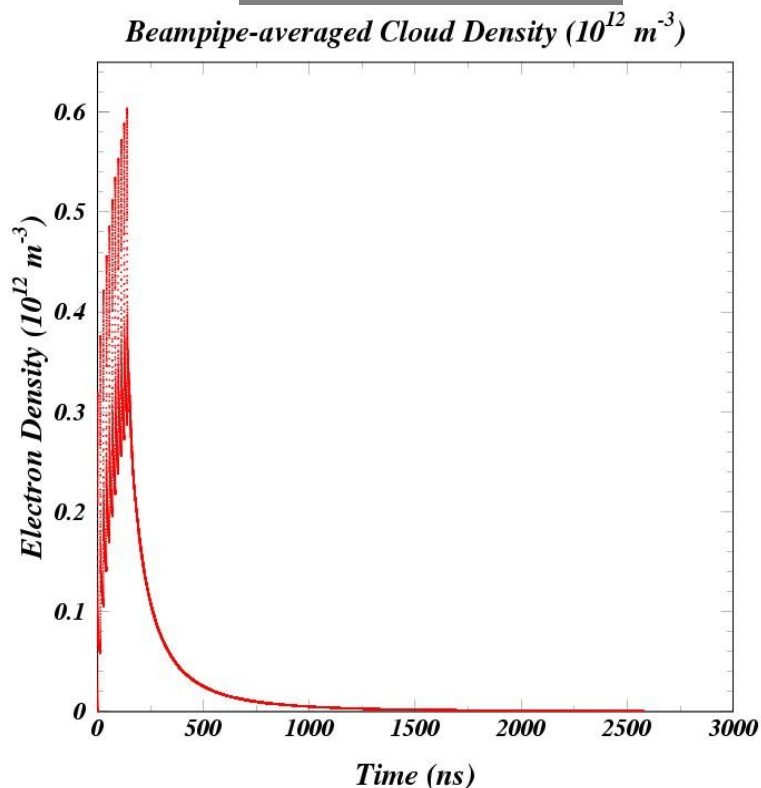
16 December 2009



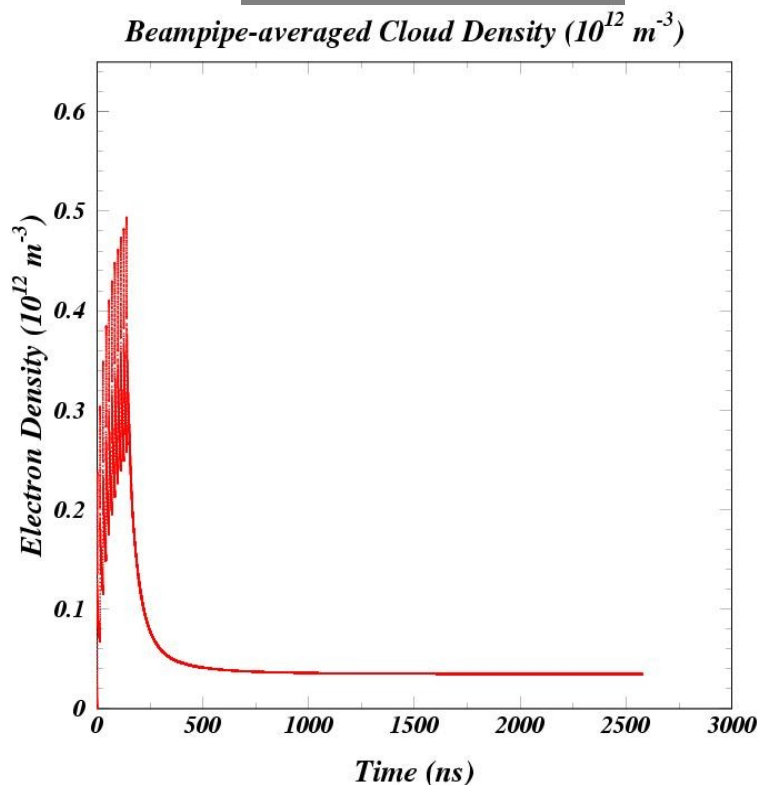


*Time development of cloud density
averaged over the 4.5 x 2.5 cm elliptical vacuum chamber*

Dipole (0.2 T)



Quadrupole (9.2 T/m)



*Conditions of June, 2008 tune shift measurements: 5.3 GeV 14-ns spacing 1.2×10^{10} e⁺/bunch
11 filled bunches followed by 172 empty ones.*

Assumed 1.1 photons/m/e (the ring-average for dipoles) and 15% reflectivity.

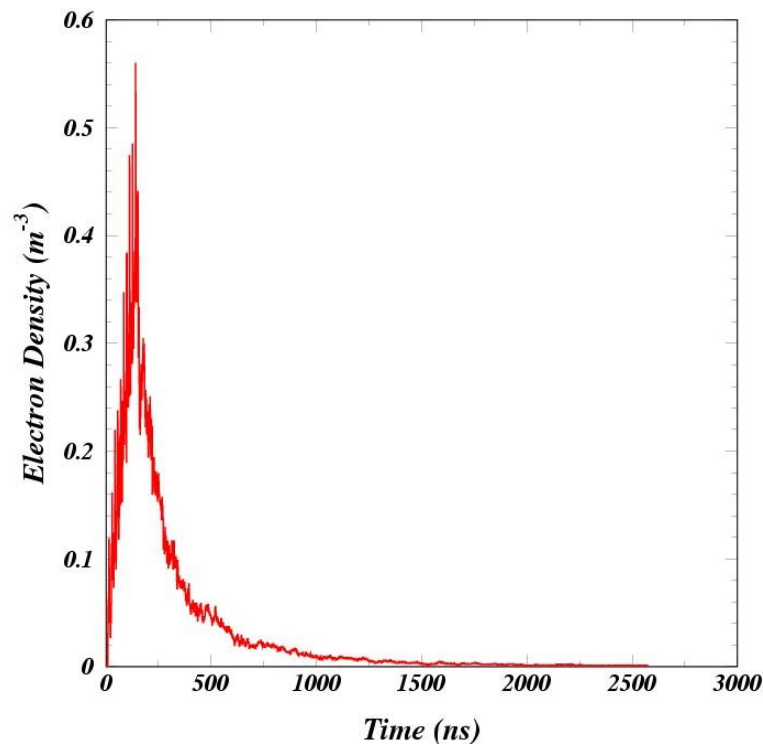
The SEY model parameters are the PAC2009 values, whereby ECLLOUD now includes the rediffused component.

The beam-pipe-averaged density indeed shows the cloud to be trapped in quadrupoles.



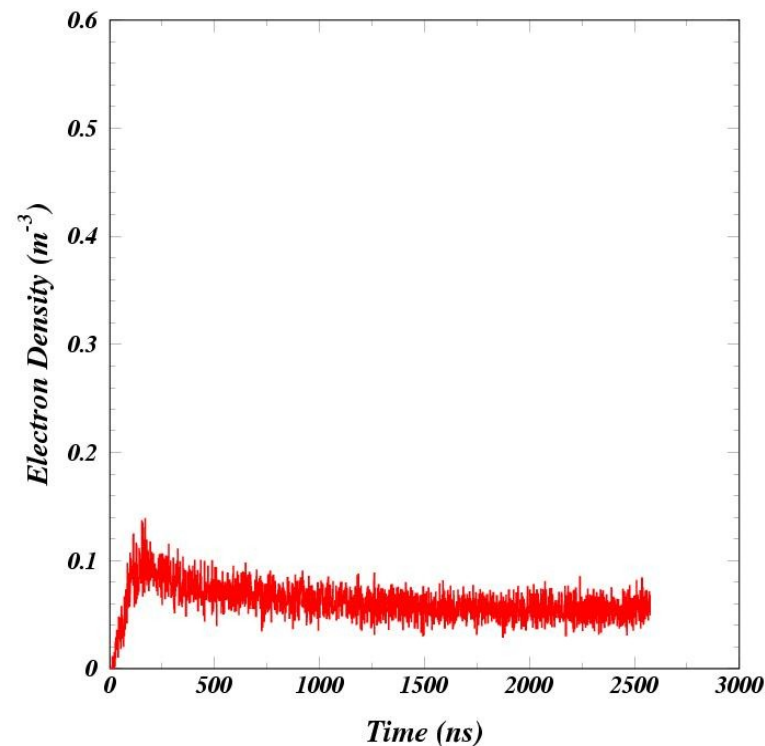
Dipole (0.2 T)

5-Sigma Cloud Density at Center of Pipe (10^{12} m^{-3})



Quadrupole (9.2 T/m)

5-Sigma Cloud Density at Center of Pipe (10^{12} m^{-3})

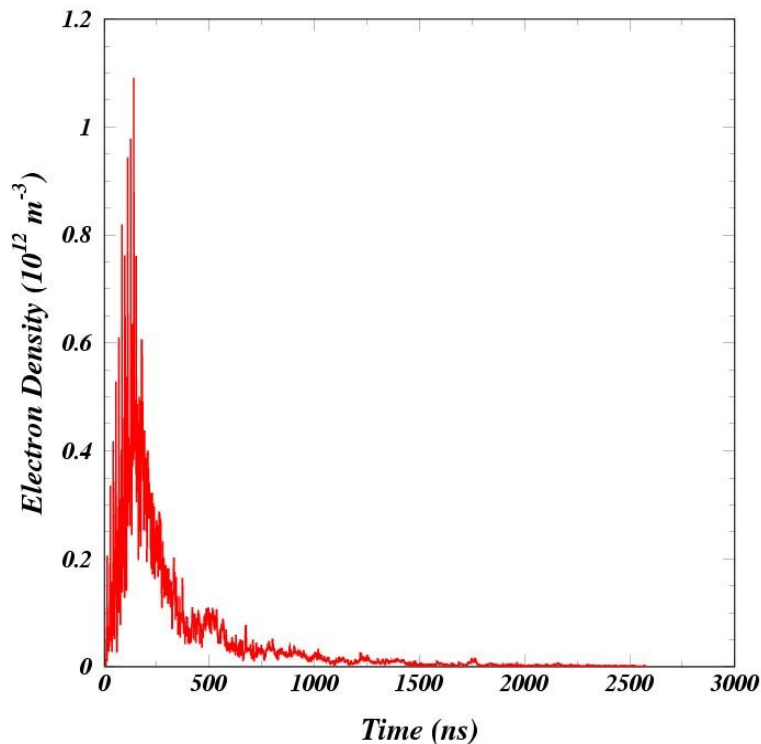


Some of the trapped cloud remains in the beam region.



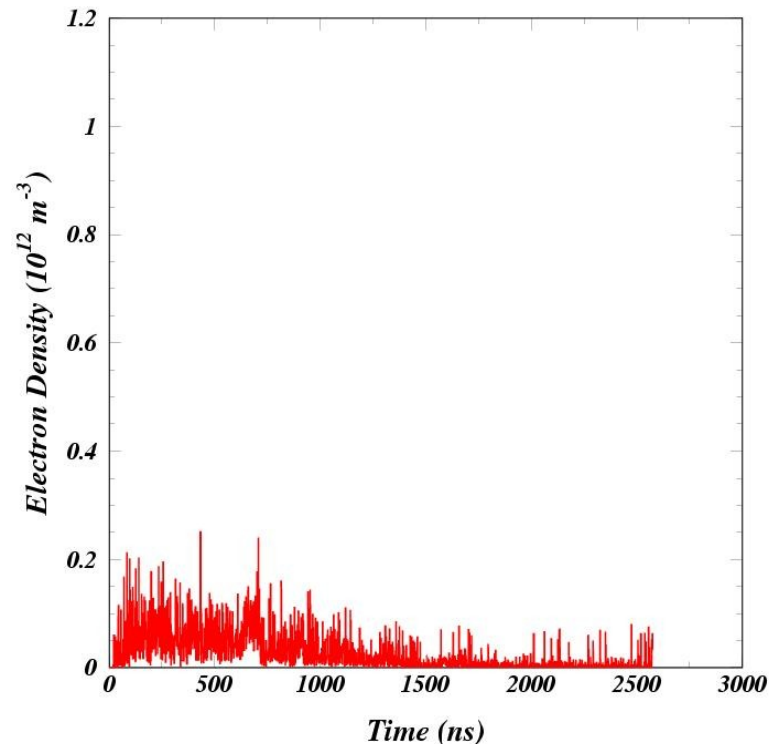
Dipole (0.2 T)

Beam-averaged Cloud Density (10^{12} m^{-3})



Quadrupole (9.2 T/m)

Beam-averaged Cloud Density (10^{12} m^{-3})



Some of the trapped cloud will contribute to tune shifts.

