Cornell University
Laboratory for Elementary-Particle Physics

ECLOUD Simulations for the Tune Shift Measurements of 19-20 December 2009

10-, 20-, 45-bunch trains with 34 mA total current

4-, 8-, 12-ns bunch spacing

Includes comparison to June 2009 measurements with 4-ns spacing for which POSINST calculations are available

13 Jan 2010: Added comparison to December 2009 measurements with 4-ns spacing

Jim Crittenden

Cornell Laboratory for Accelerator-Based Sciences and Education

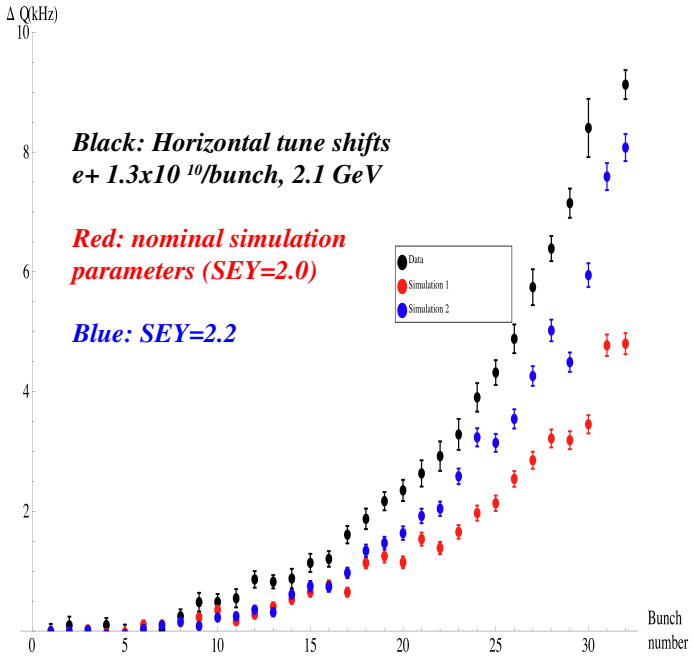
Electron Cloud Meeting

6 January 2010

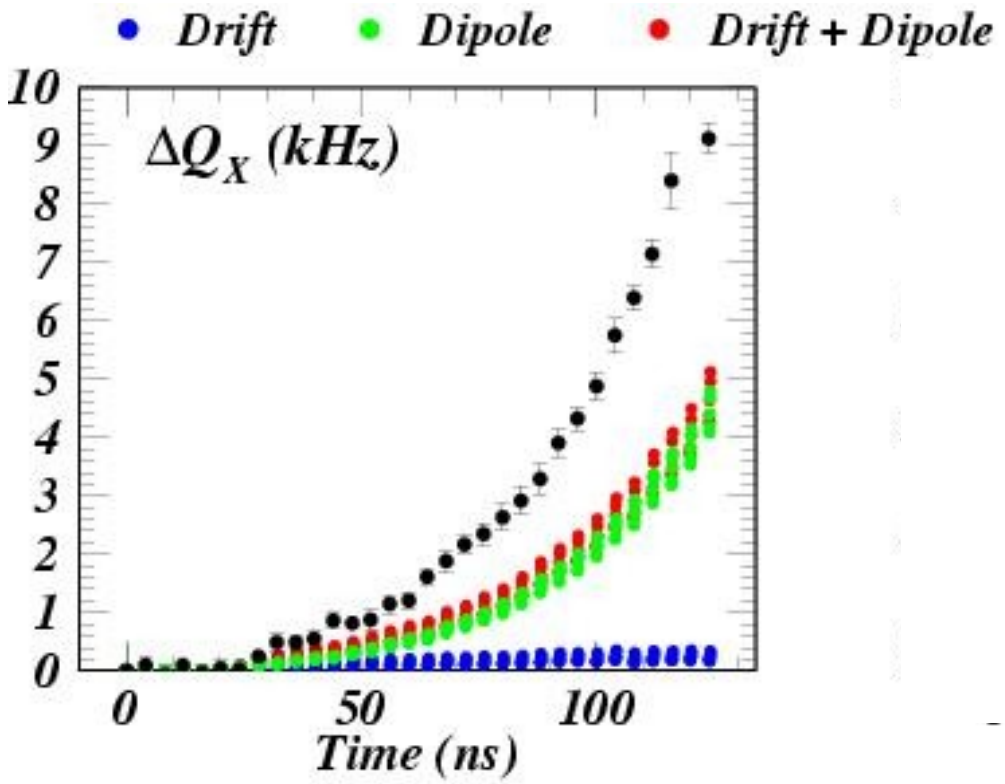
ECLOUD Simulations for Measurements of 10 June 2009

CTA_2085MEV_20090516, 32-bunch train, 4-ns spacing, 0.8 mA/bunch

POSINST (Gerry)
Electron cloud meeting 6/17/2009



ECLOUD

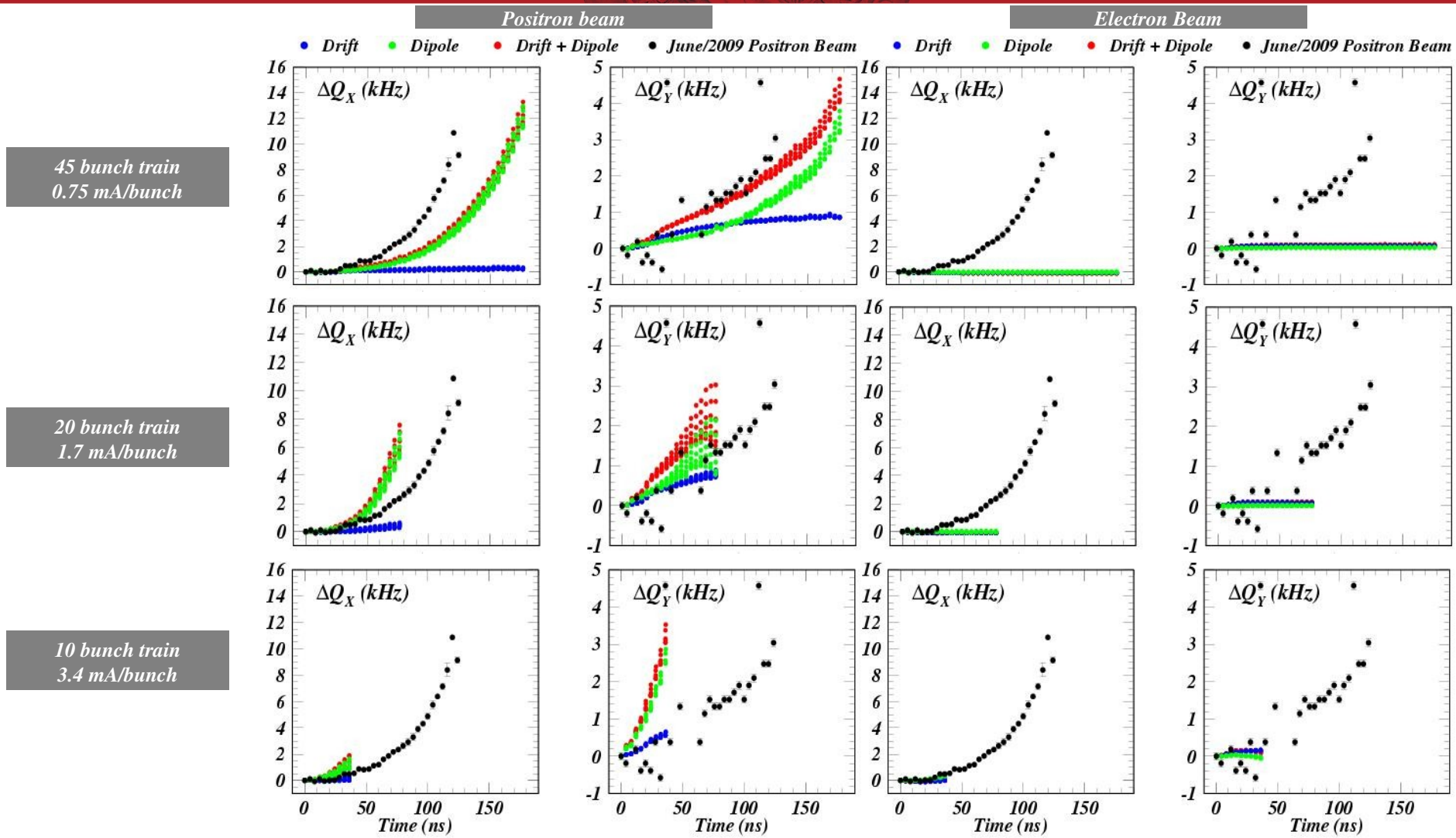


The POSINST and ECLOUD field gradient calculations are consistent with each other. Each underestimates the horizontal tune shift.

ECLOUD Simulations for Measurements of 19/20 December 2009

CTA_2085MEV_20090516, 4-ns spacing, 34 mA total current

Compare to 32-bunch, 4-ns spacing, 0.8 mA/bunch measurements of June 2009

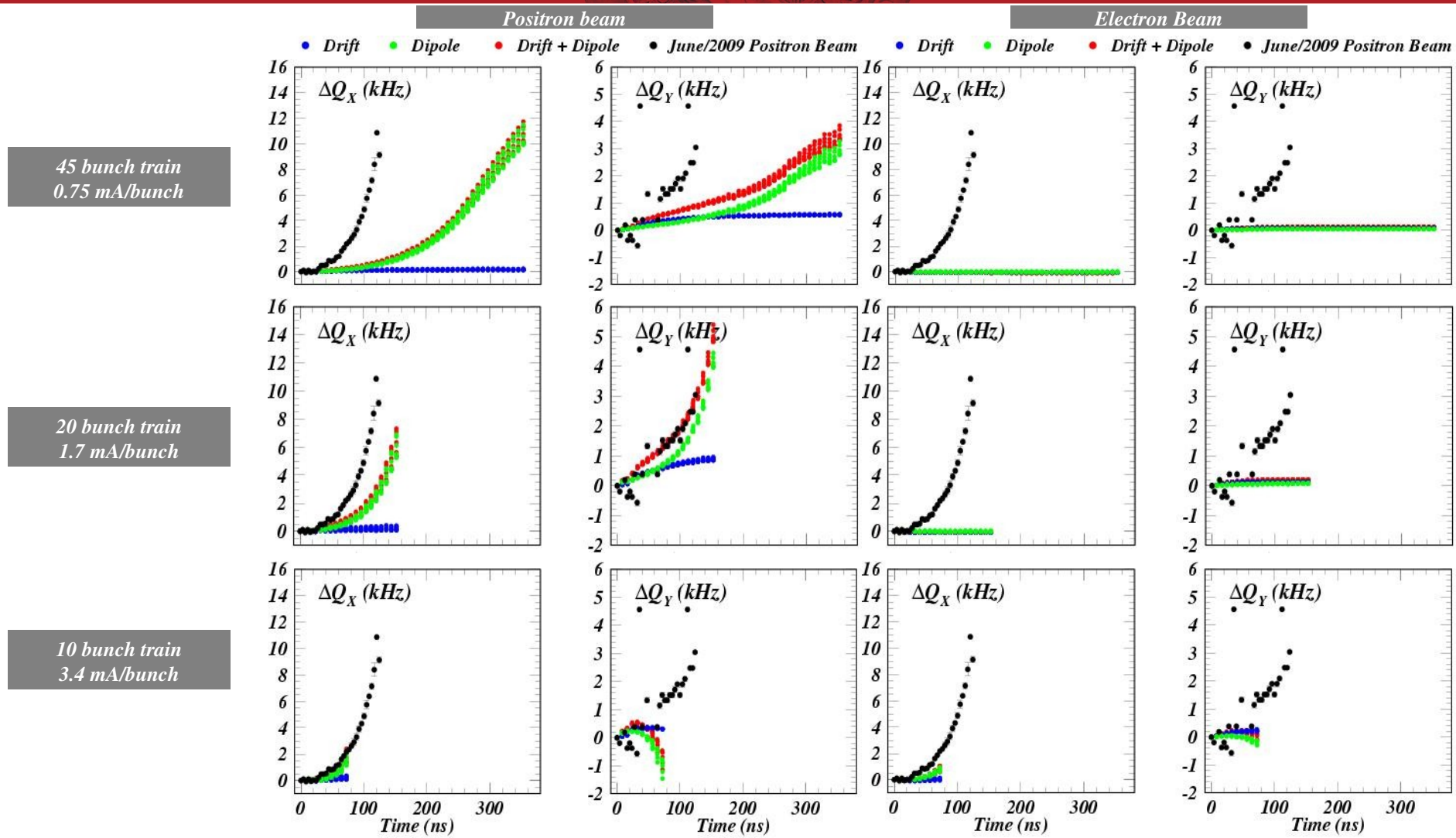


Remarkable variety in positron tune shifts. Electron tune shifts negligible.

ECLOUD Simulations for Measurements of 19/20 December 2009

CTA_2085MEV_20090516, 8-ns spacing, 34 mA total current

Compare to 32-bunch, 4-ns spacing, 0.8 mA/bunch measurements of June 2009

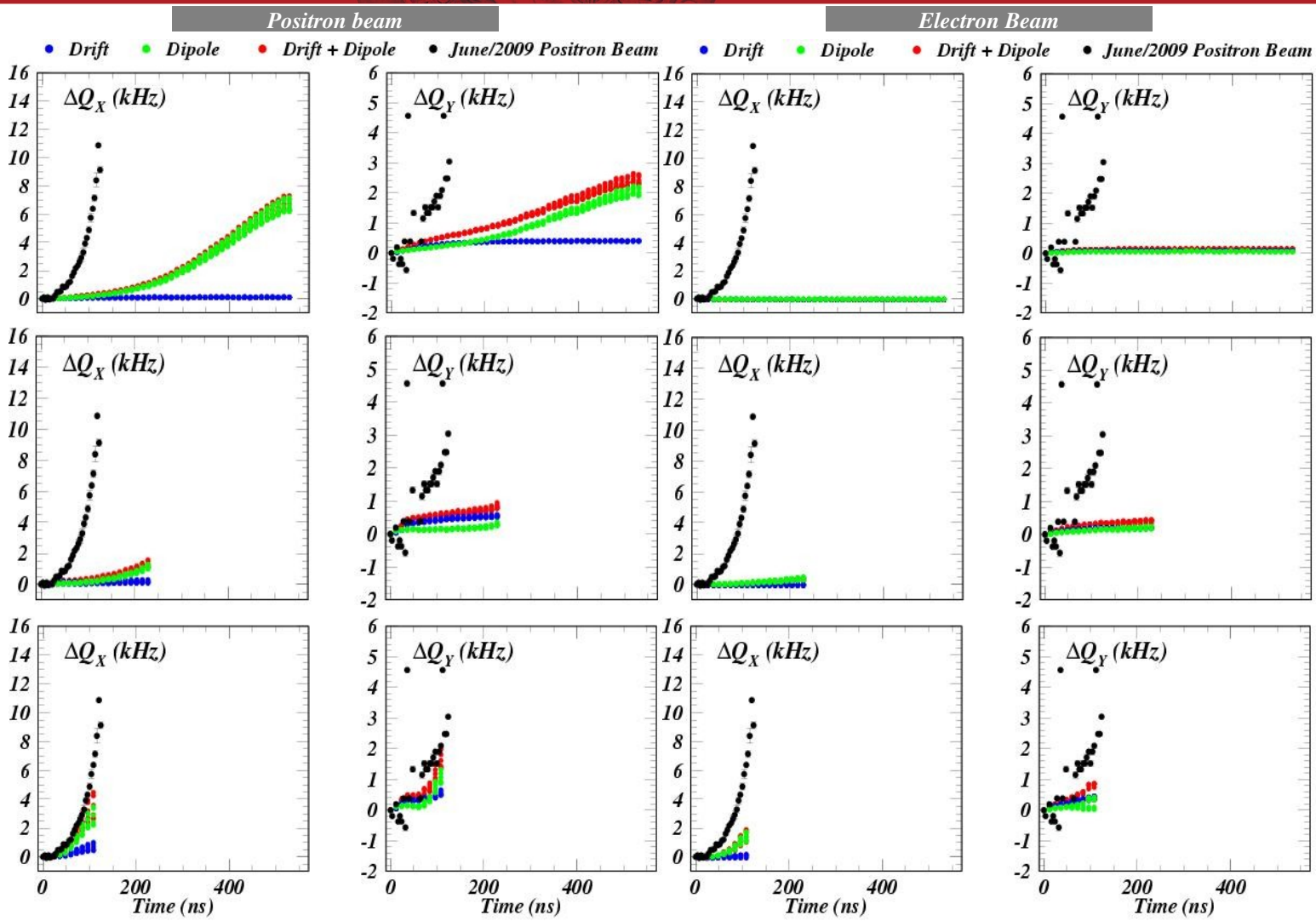


Remarkable variety in positron tune shifts also for 8-ns spacing, including sign change.

ECLOUD Simulations for Measurements of 19/20 December 2009

CTA_2085MEV_20090516, 12-ns spacing, 34 mA total current

Compare to 32-bunch, 4-ns spacing, 0.8 mA/bunch measurements of June 2009

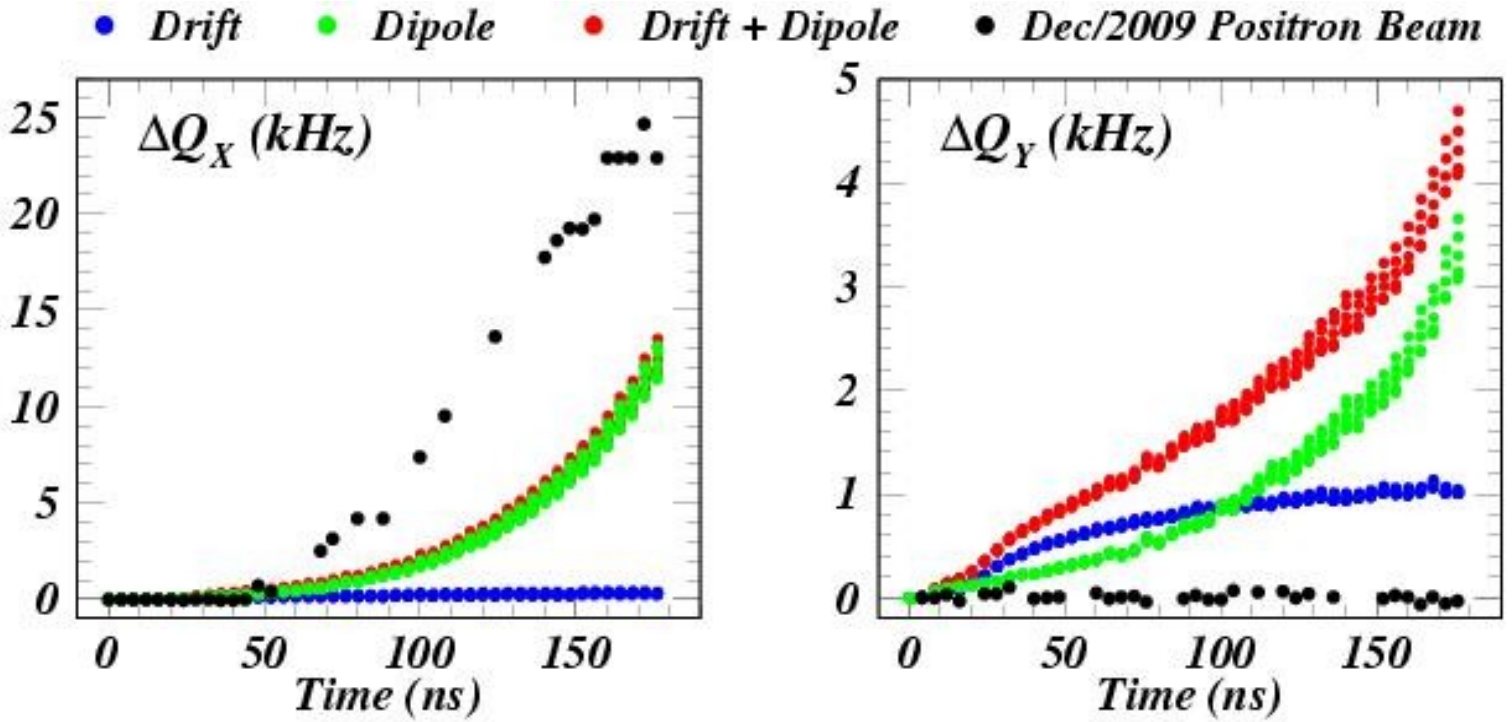


The results for 12-ns spacing give information on how the 14-ns data is likely to behave.

ECLOUD Simulations for Measurements of 19 December 2009

CTA_2085MEV_20090516, 4-ns spacing, 45 mA total current

Compare to 45-bunch, 4-ns spacing, 0.75 mA/bunch measurements of December 2009



New record for horizontal tune shift: 25 kHz !

ECLOUD factor two underestimate for ΔQ_x similar to that observed for the June 2009 measurements for both ECLOUD and POSINST.

Apparently no vertical excitation of the beam, so no vertical tune measurement.