Cornell University
Laboratory for Elementary-Particle Physics

Cursory Update on Modeling the Q48W Shielded Stripline

Measurements of Electron Cloud Trapping

-- Update to status presented on 4 Dec 2013 --

-- Slide 2 updated after meeting to correct time offset: 5112-->5124 ns --

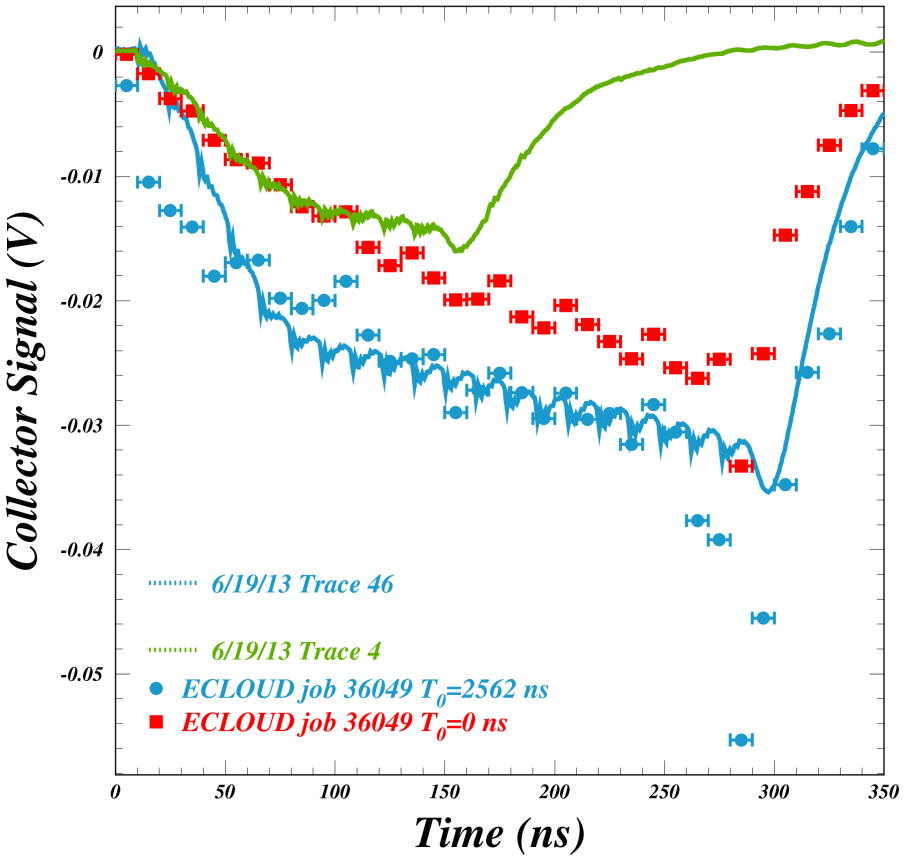
Jim Crittenden

Electron Cloud Meeting

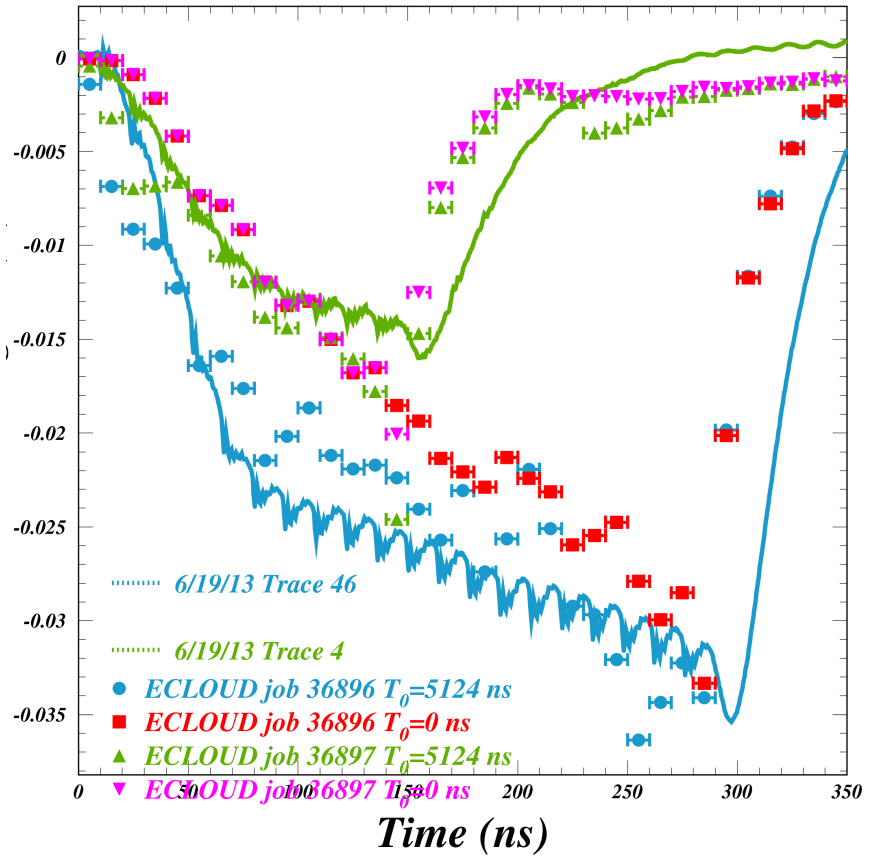
26 March 2014

Updated Status of Cloud Trapping Model
5.3 GeV 8 mA/bunch

4 December 2013
20-bunch train only
Compared only first turn and second turn

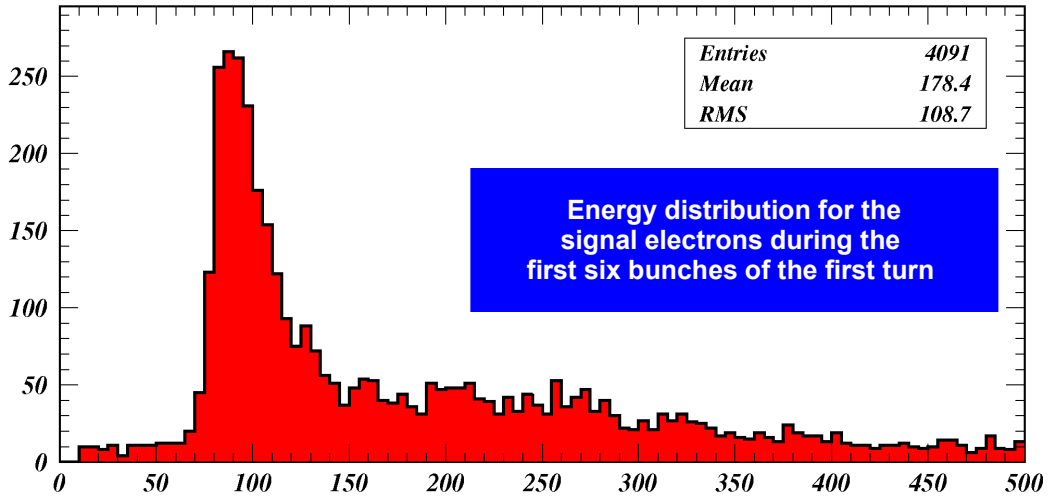


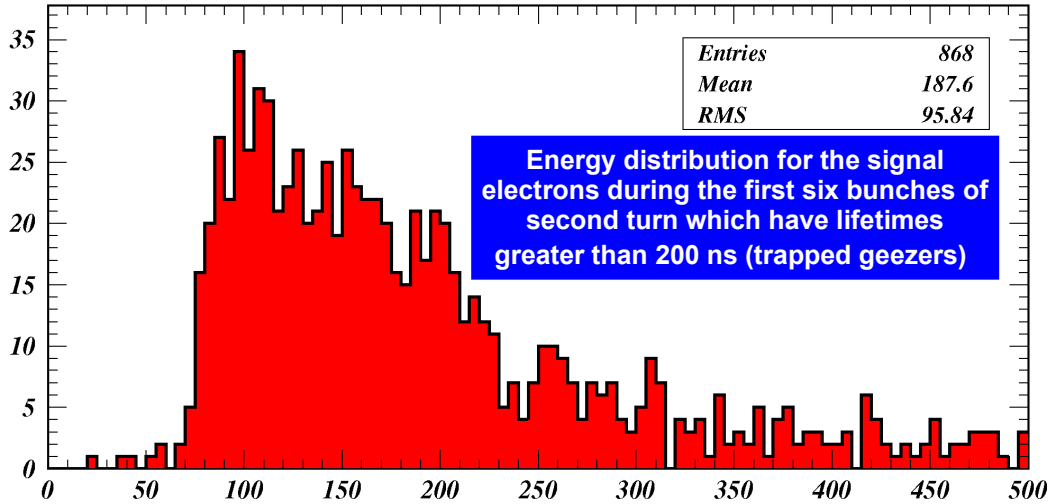
Now compare 10-bunch and 20-bunch trains on first and third turns



The model is *extremely* sensitive to the SEY parameters.

Detailed SEY Tuning





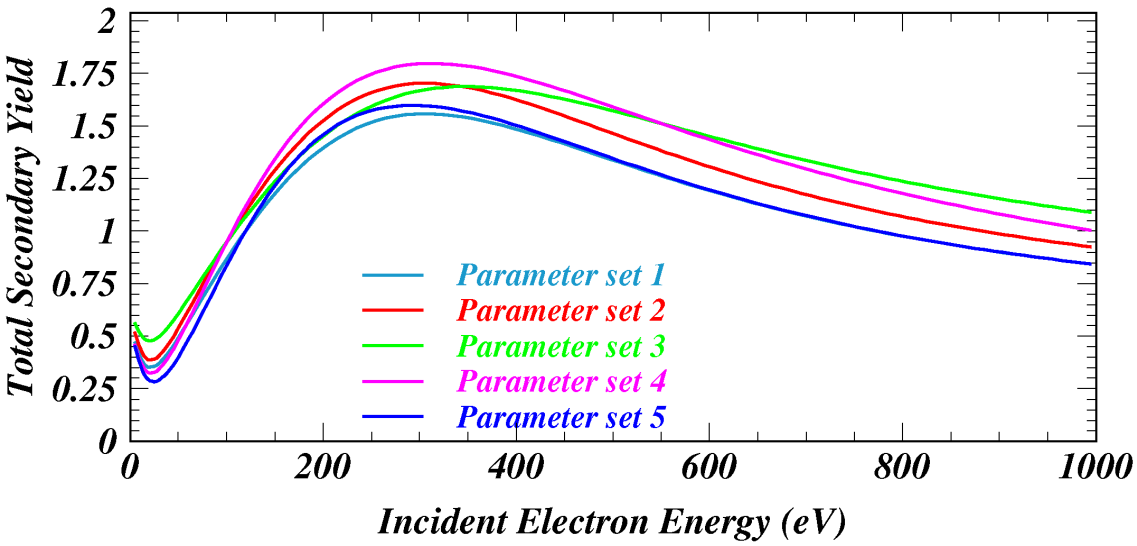
Arrival energy of signal electrons (eV)

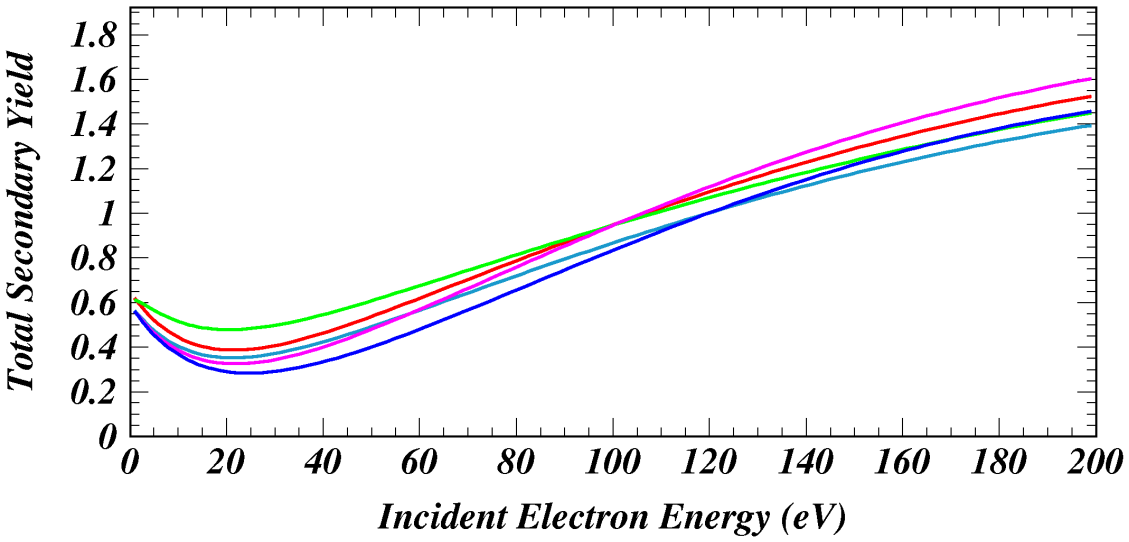
Trapped electrons hit the wall with (slightly) higher energies during the passage of the first bunches of the train because they are closer to the beam.

The modeled signal from trapped electrons depends in detail on their survival during the passsage of the first six bunches of the train. Since they hit the walls several times, their survival with sufficient charge depends on the SEY.

To reproduce the observed signal from trapped electrons, the SEY curve is tightly constrained between 70 and 250 eV, since it must distinguish between the newly produced and the trapped electrons.

Detailed SEY Tuning





The shape of the SEY curve is governed by the true secondary peak energy, the true secondary S parameter, the rediffused threshold energy and the rediffused turn-on slope R.

These parameters are decorrelated by the very different energy distributions of the secondaries from the two processes.

However, just as for the photoelectron energy distribution, the sensitivity to the difference in secondary energy distribution is reduced at high bunch current.

In other words, varying the bunch current will help further constrain the shape of the SEY curve.