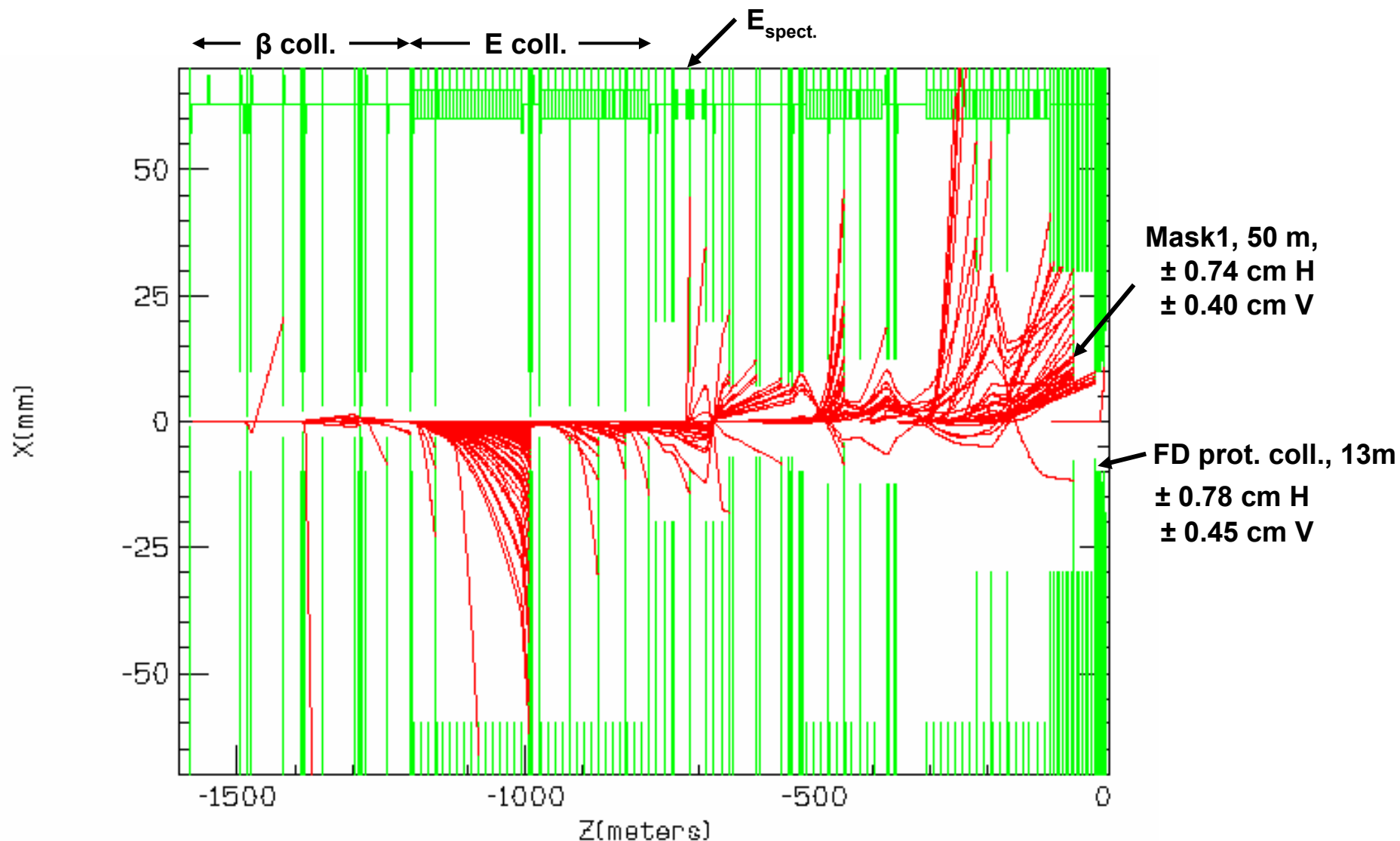


Beam-gas Bremsstrahlung and Coulomb Scattering in the ILC

December 5, 2006

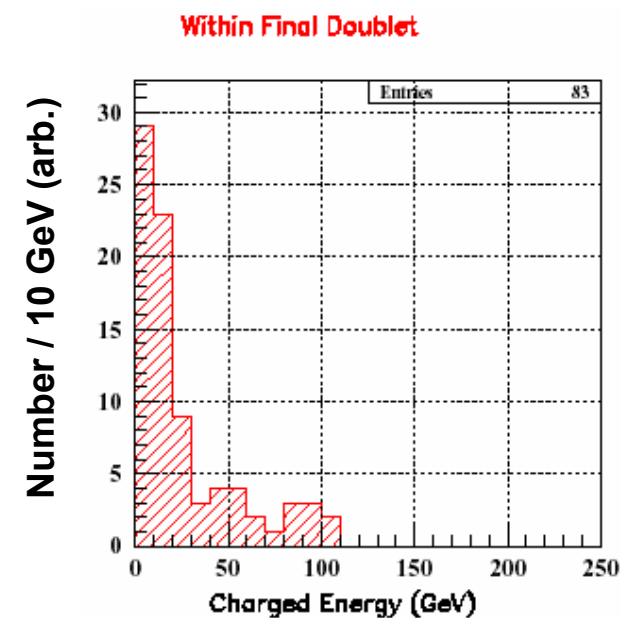
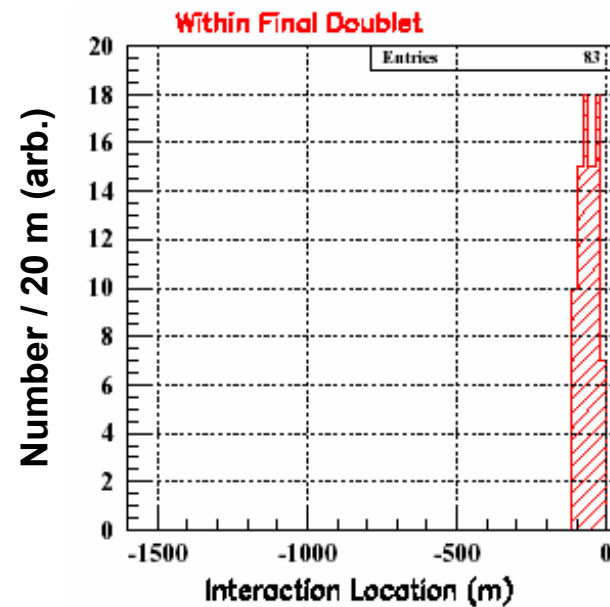
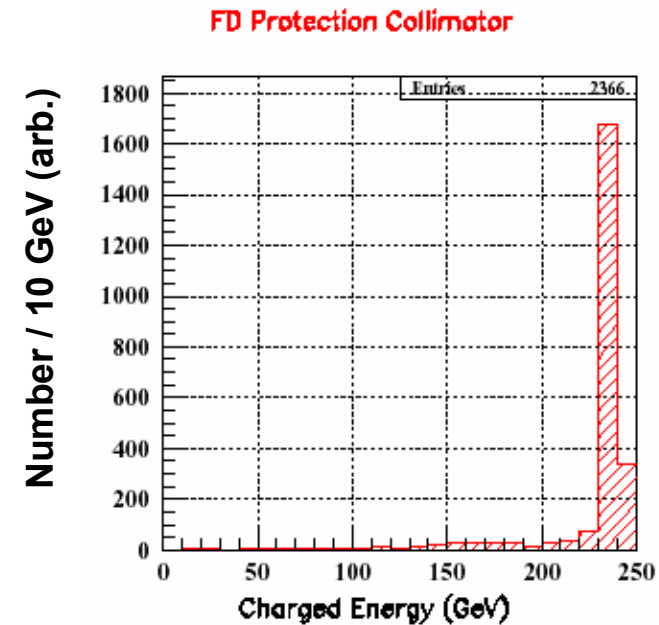
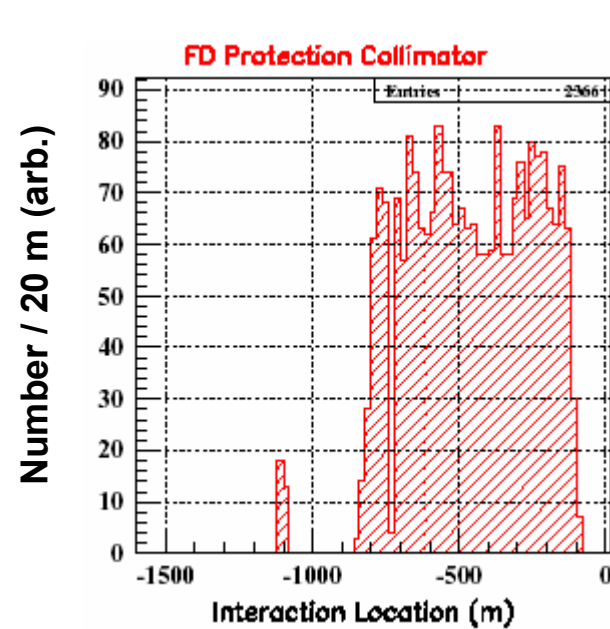
L. Keller

150 random beam-gas brem. trajectories in the BDS using BDS2006c TURTLE



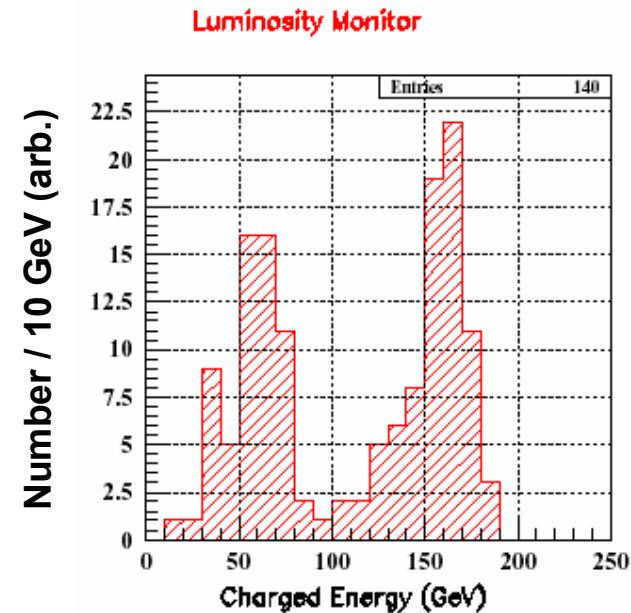
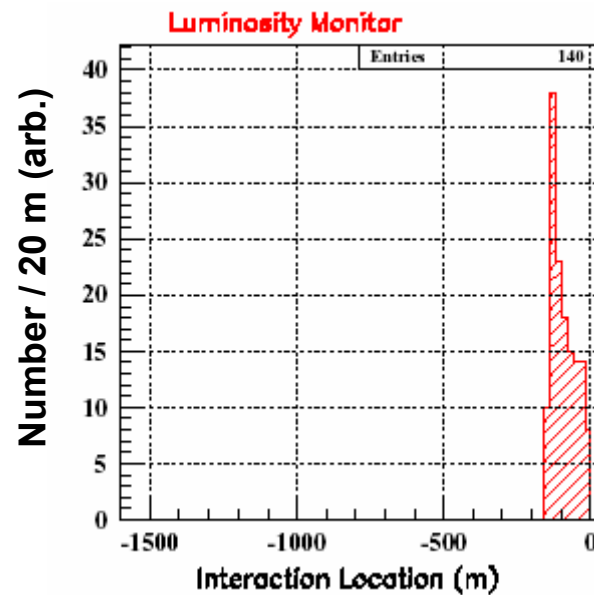
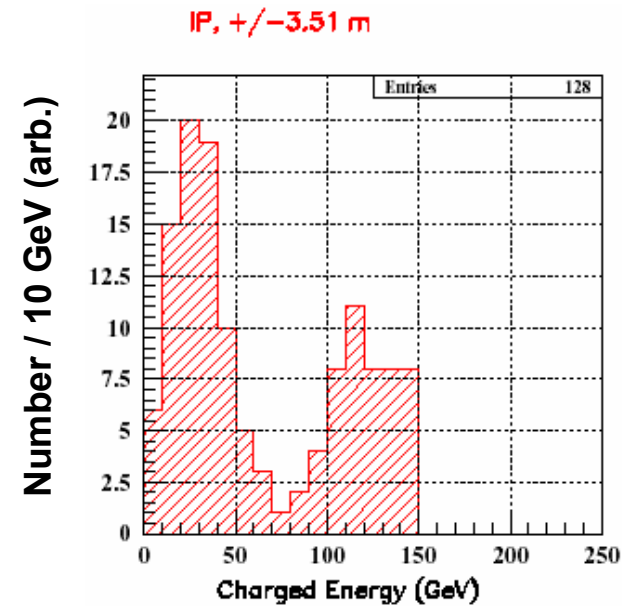
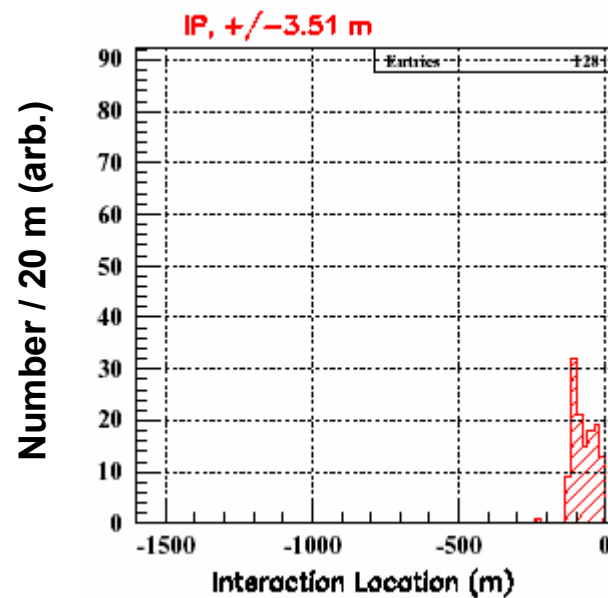
Origin and Energy Distribution of Charged Beam-gas Bremsstrahlung for Hits Near FD

Dec. 15, 2006



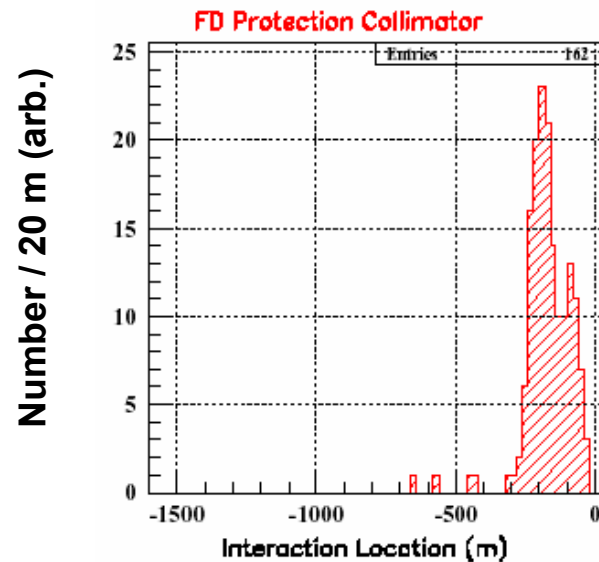
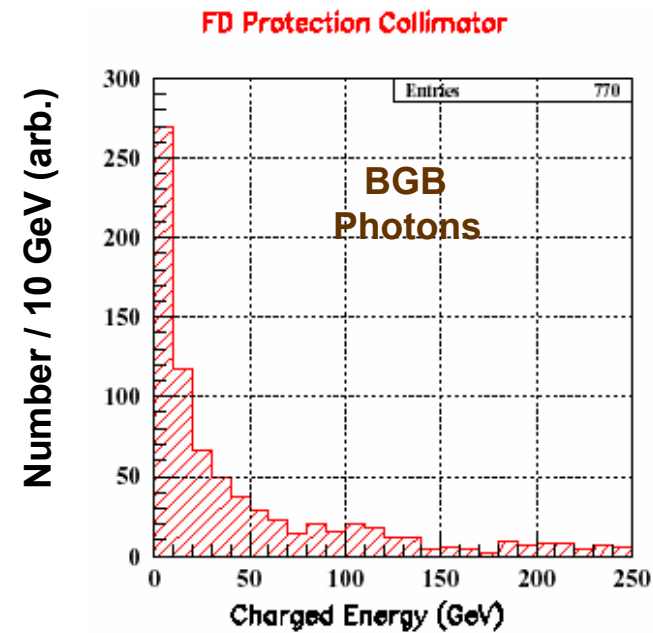
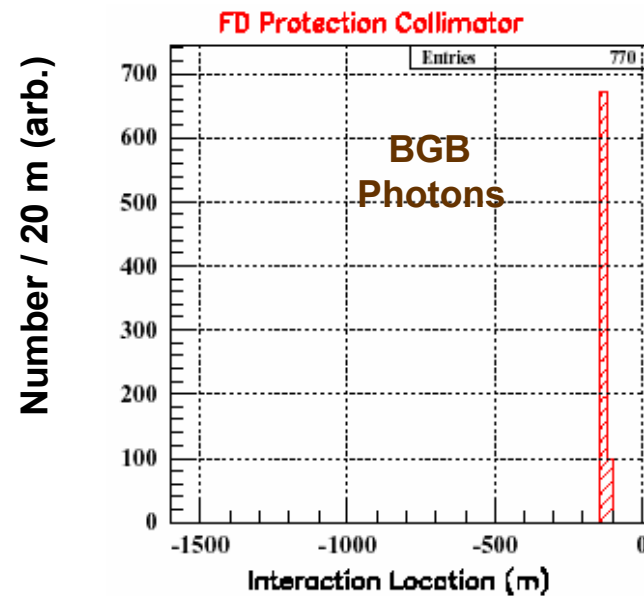
Origin and Energy Distribution of Charged Beam-gas Bremsstrahlung within the IP Region

Dec. 15, 2006



Origin and Energy Distribution of BGB Photons and Coulomb Electrons Hitting the FD Protection Collimator

Dec. 15, 2006



Coulomb electrons
(all beam energy)

Summary of Hits/bunch and Hits/160 bunches (TPC) – 10 nTorr

Dec. 15, 2006

— Hits/bunch

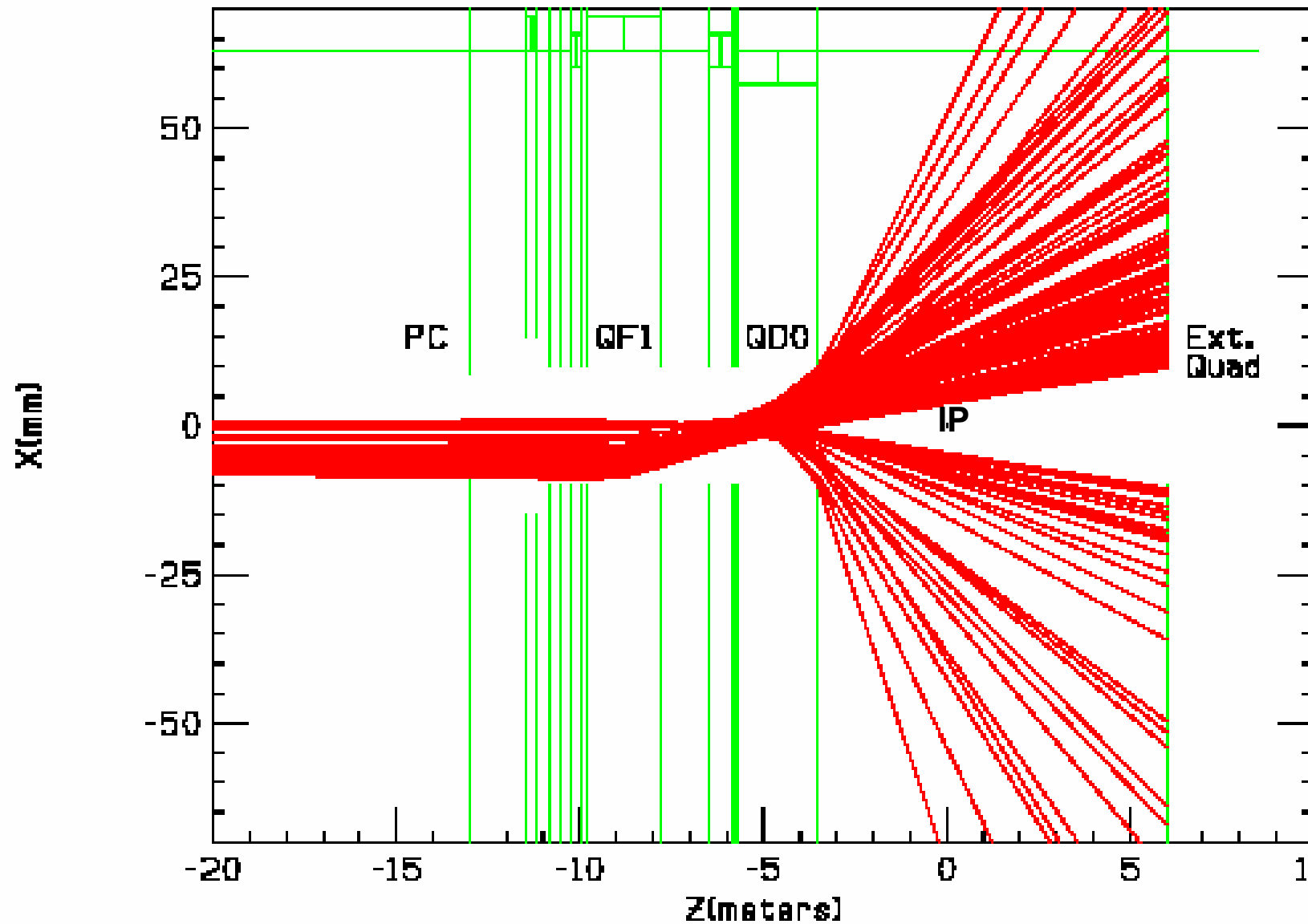
— Hits/160 bunches (TPC)

Hit Location	Beam-gas bremsstrahlung (charged)		Beam-gas bremsstrahlung (photons)		Coulomb scattering (charged)	
	Number	<E>	Number	<E>	Number	<E>
FD Protection Collimator	0.17 27.2	235 GeV	0.056 9.0	~50 GeV	0.009 1.4	250 GeV
Inside F.D.	0.006 1.0	~100 GeV	0	-	0	-
IP (± 3.0 m)	0.009 1.4	~100 GeV	0	-	0	-
Lumosity Monitor (3.0 – 3.5 m)	0.01 1.6	~100 GeV	0	-	0	-

Totals: FD protection collimator = 0.23/b, 37.6 TPC
 FD and IP region = 0.025/b, 4.0 TPC } 10 nTorr

Beam-Gas Bremsstrahlung Electrons Hitting Beyond the Final Doublet.

Average Energy = $0.4 E_{\text{beam}}$, $N = 0.025/\text{bunch}$ @ 10nT, $N = 4.0$ per TPC sensitive time



Summary for 10 nTorr:

1. Within the FD and the IP region there are **0.025 hits/bunch** and **4.0 hits/160 bunches (TPC)** at an average energy of about **100 GeV/hit** originating **0 – 150 m** from the IP.
2. On the FD protection collimator there are **0.23 hits/bunch** and **37.4 hits/160 bunches (TPC)** at an average energy of about **240 GeV/hit** originating **0 – 800 m** from the IP.
3. Need feedback from the detector groups on the effect of these hit rates on their detectors.
4. Beyond 800 m from the IP the pressure could conceivably be at least an order of magnitude higher than 10 nTorr, pending look at BGB background in the Compton polarimeters and energy spectrometers.