IFR Background Report

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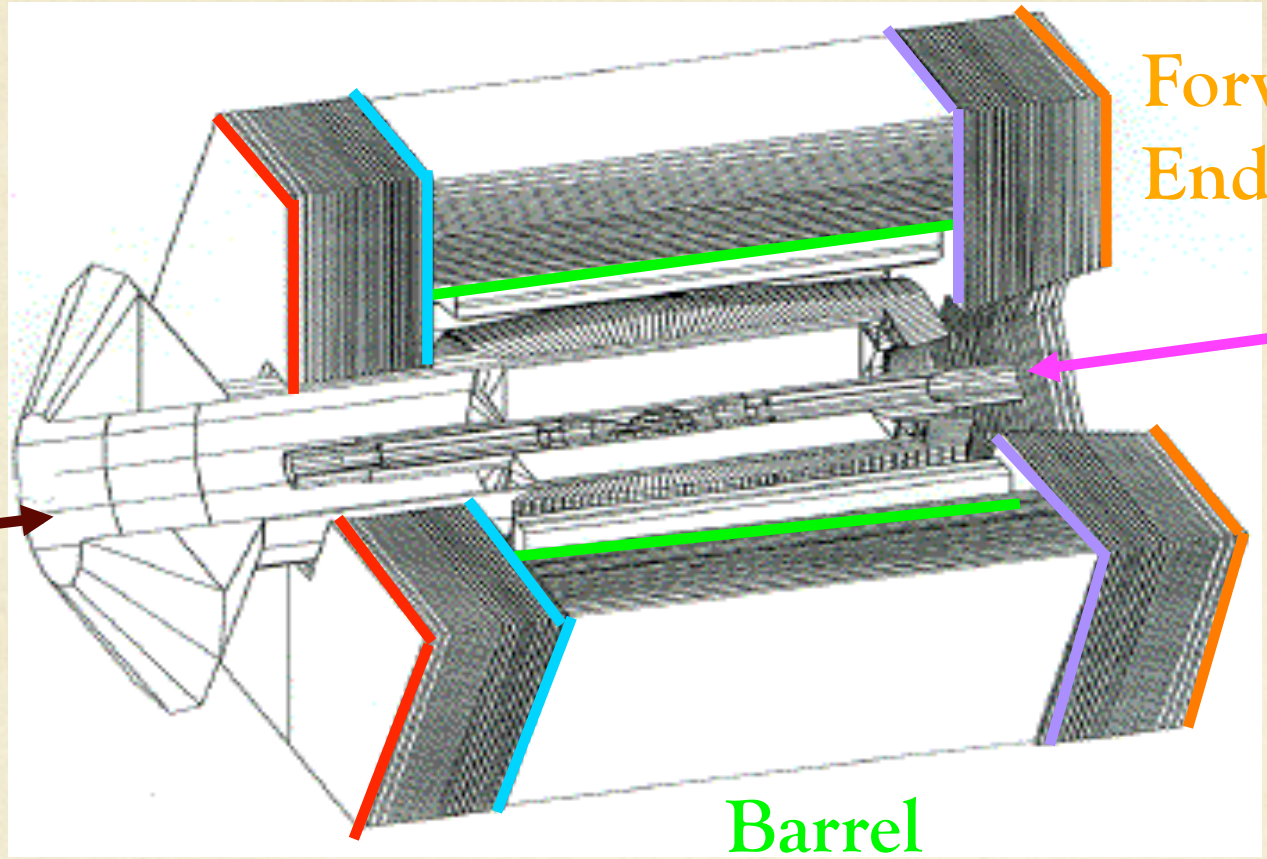
Hot regions



Barrel: innermost layers, mostly neutrons

FWD encaps (hottest region) : inner layer and outer layers (BEAM halo), neutrons, electron and photons

BWD encaps: inner layer and small radii

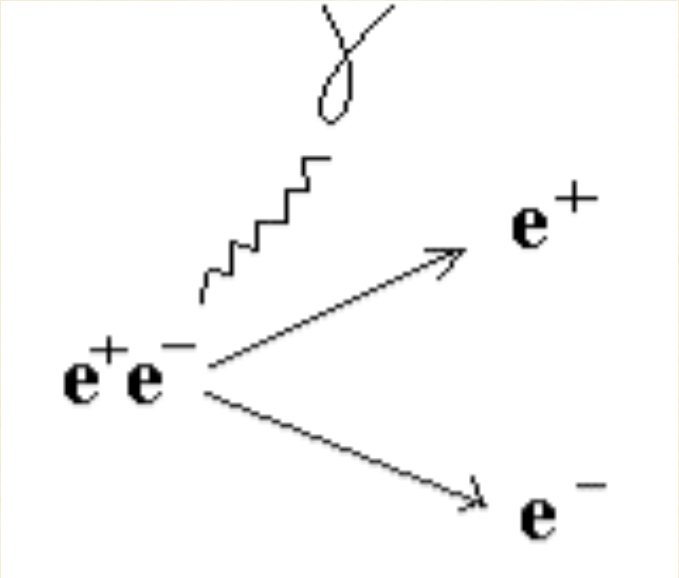
Outline

BhaBha Studies for different FF simulations

Tousheck background

- Detailed neutron background analysis (HER and LER)

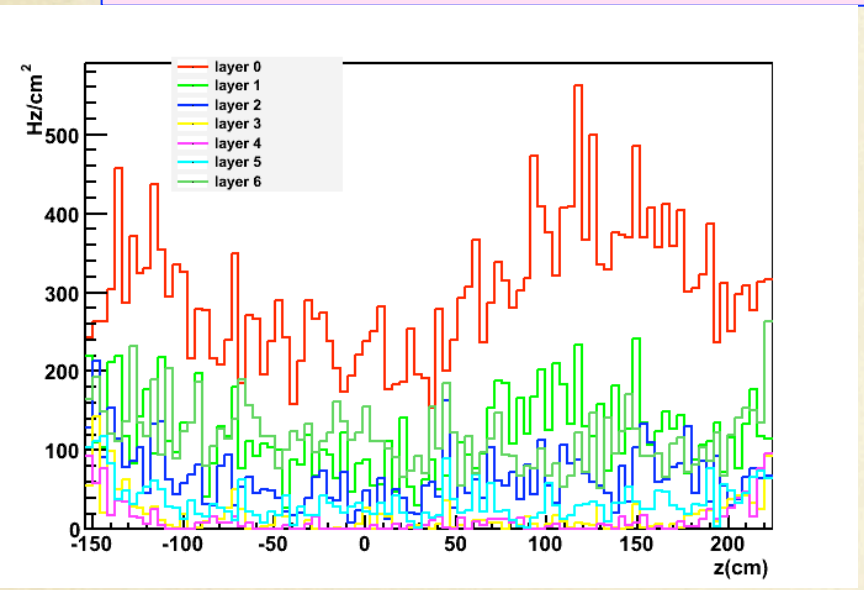
Radiative BhaBha background crossing the IFR detector



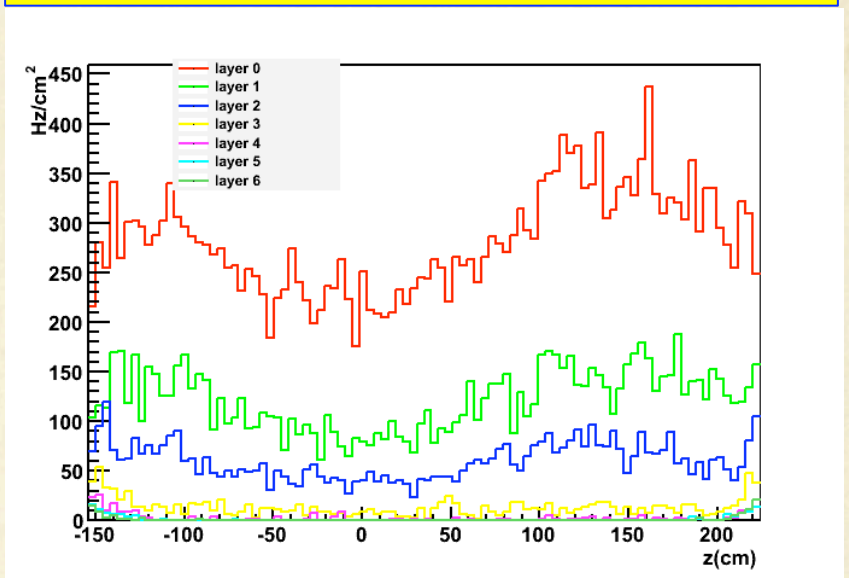
Neutron Rate for Barrel for different FF simulations

Rate vs Z-coordinate

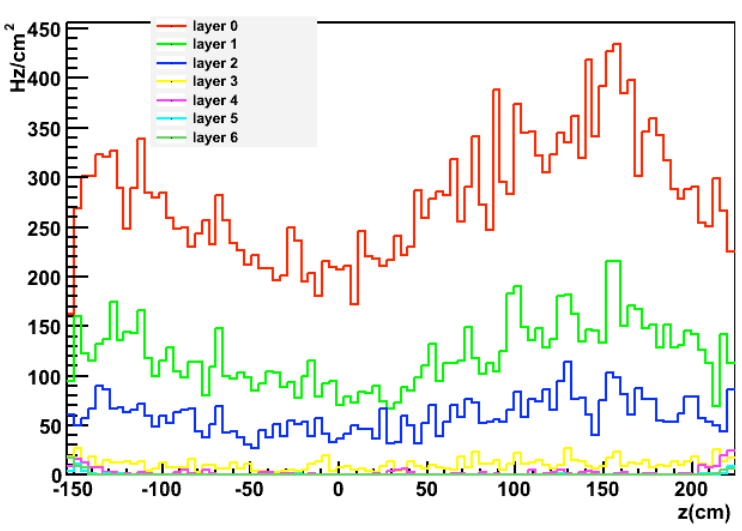
(FF) from -16 to 16 m from the IP.



(FF) from -8 to 8 m from the IP.



(FF) from -5 to 5 m from the IP.

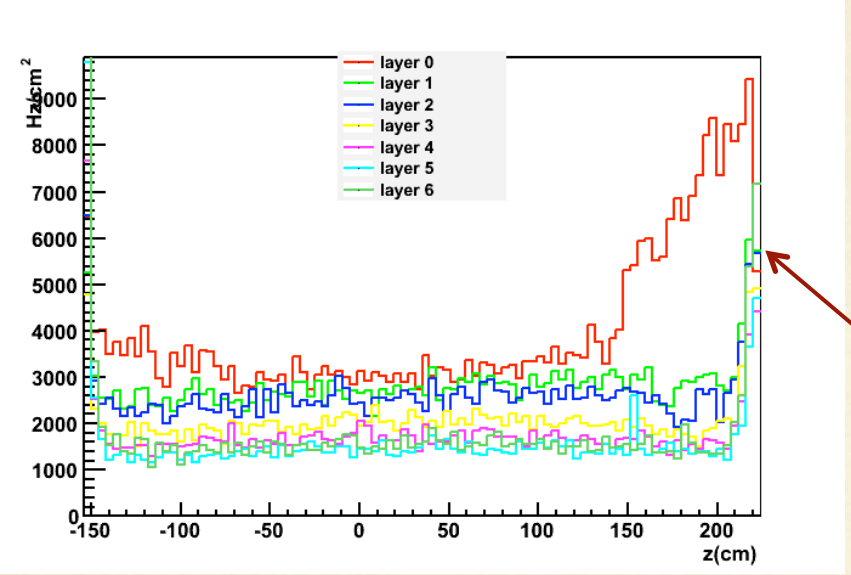


Rates from (16m) to 5m decrease of ≈25%

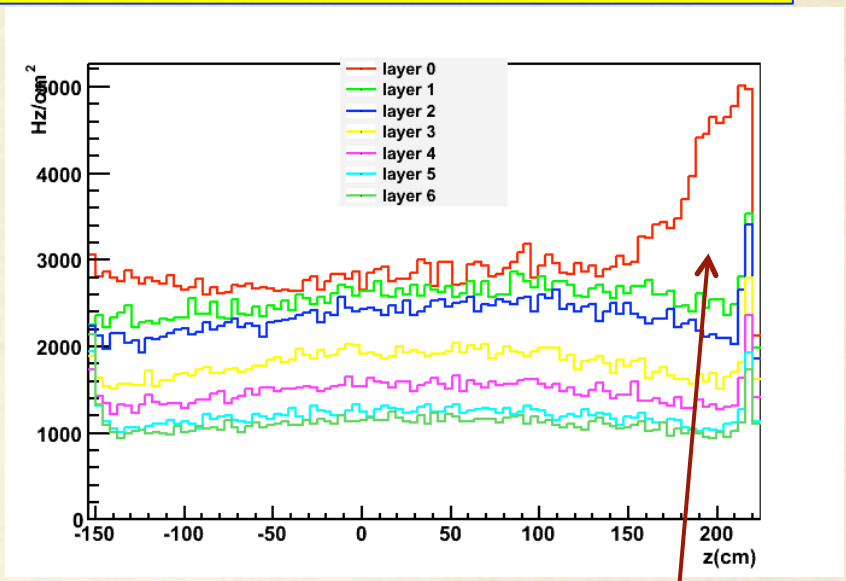
Photon Rate for Barrel for different FF simulations

Rate vs Z-coordinate

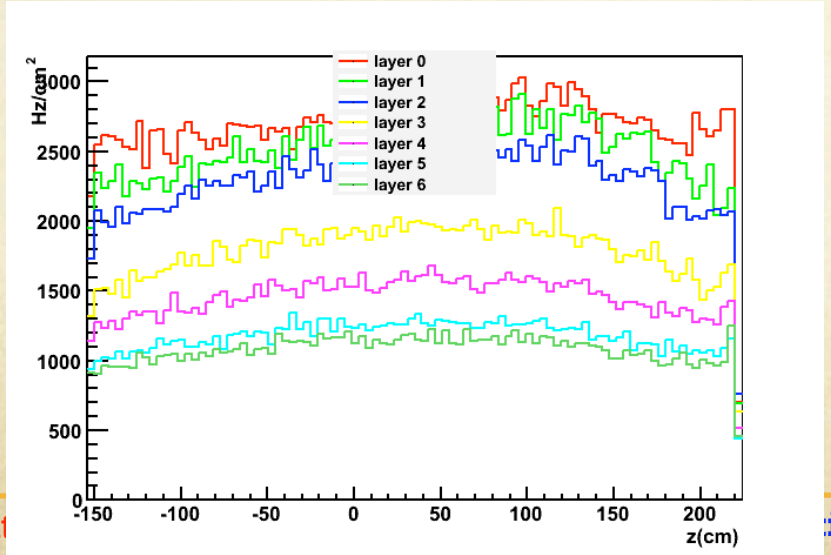
(FF) from -16 to 16 m from the IP.



(FF) from -8 to 8 m from the IP.



(FF) from -5 to 5 m from the IP.

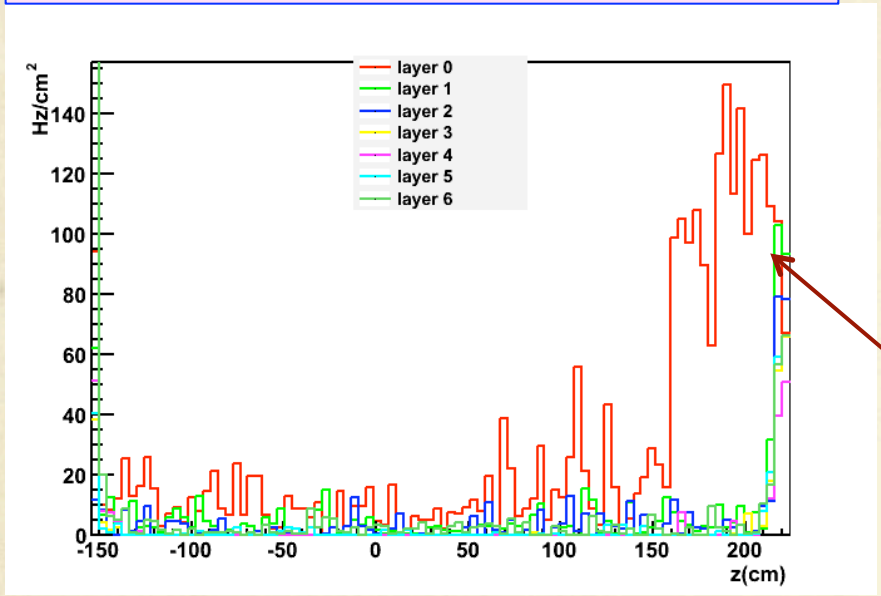


Rates at high-z change dramatically for photons

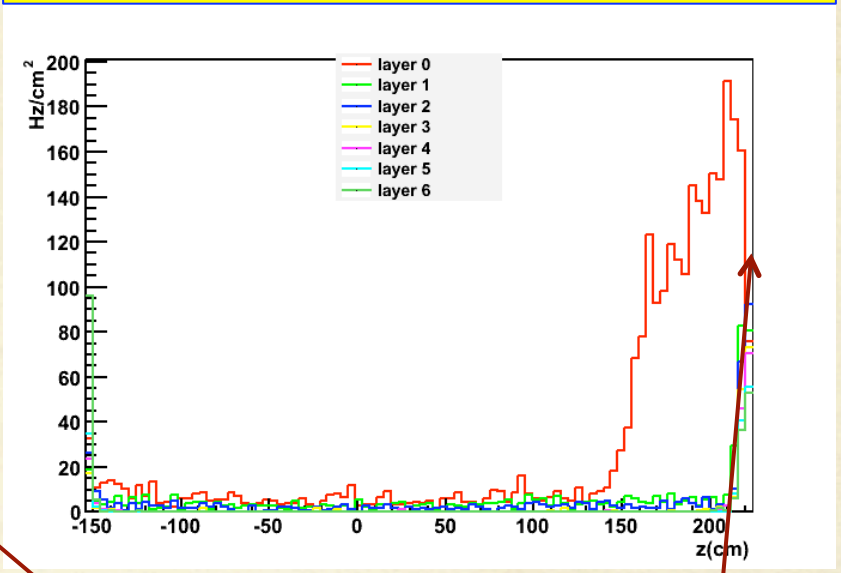
Electron Rate for Barrel for different FF simulations

Rate vs Z-coordinate

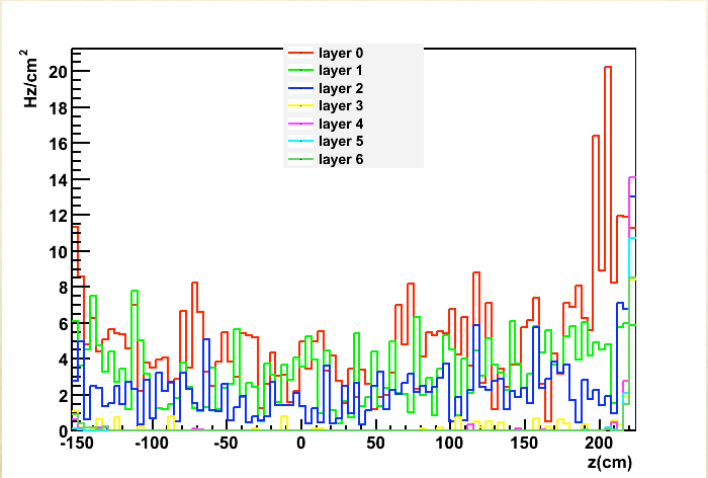
(FF) from -16 to 16 m from the IP.



(FF) from -8 to 8 m from the IP.



(FF) from -5 to 5 m from the IP.

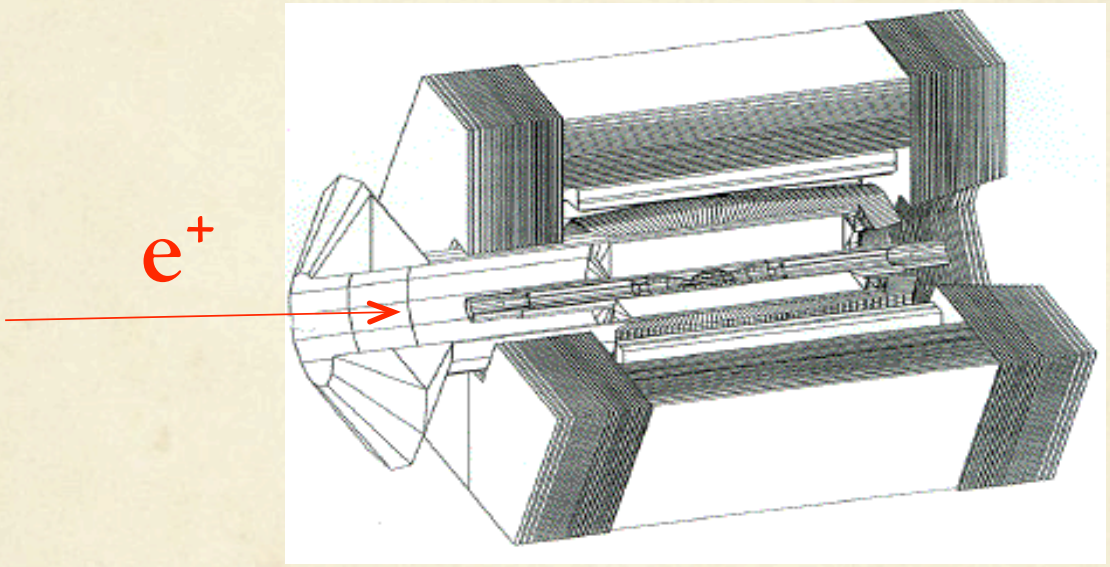


Rates at high-z change dramatically for electrons

Summary on BhaBha studies

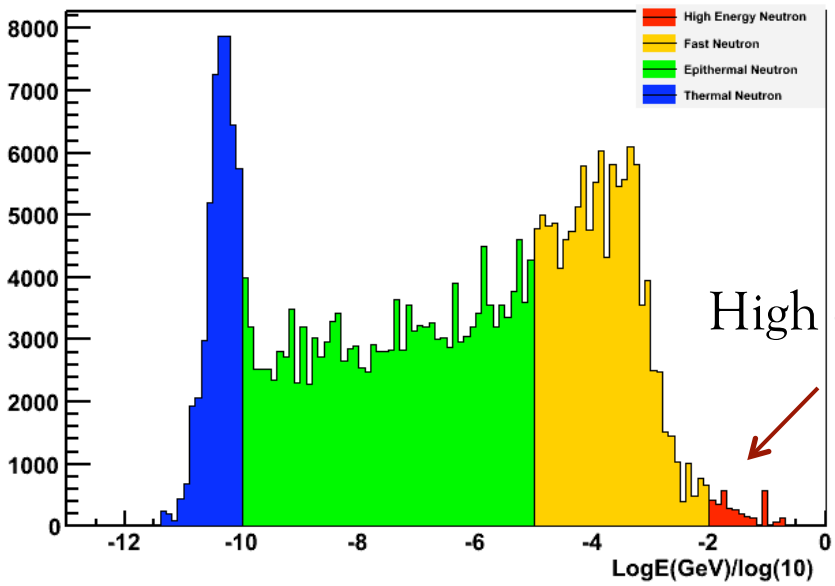
- ✓ The neutrons rates do not change dramatically for the different FF simulation
- ✓ The photons and electrons rates change for high-Z value

Touschek events HER



Neutron Energy Distributions for Touschek HER events

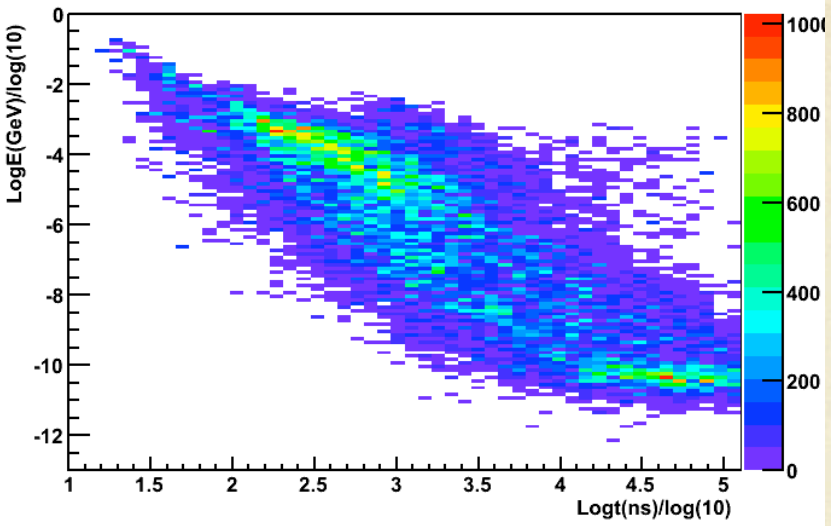
Barrel



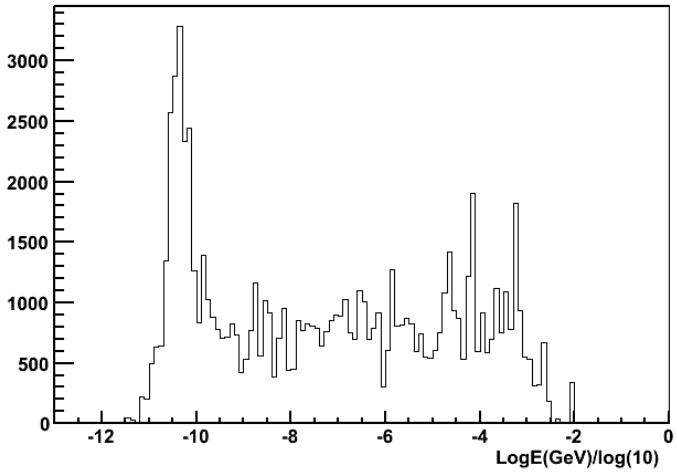
High energy neutrons

Barrel

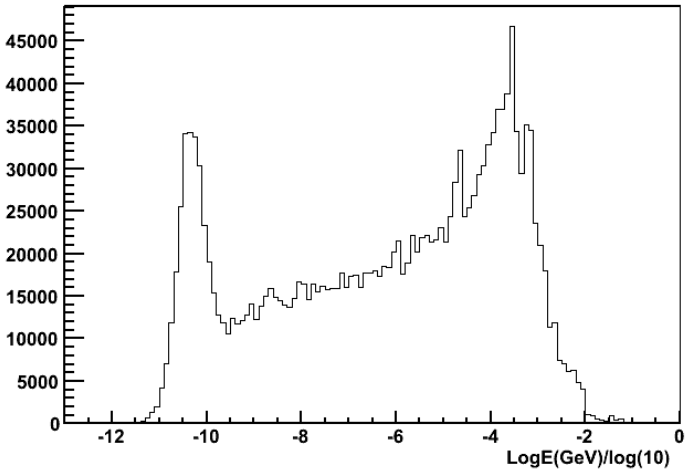
Energy vs time



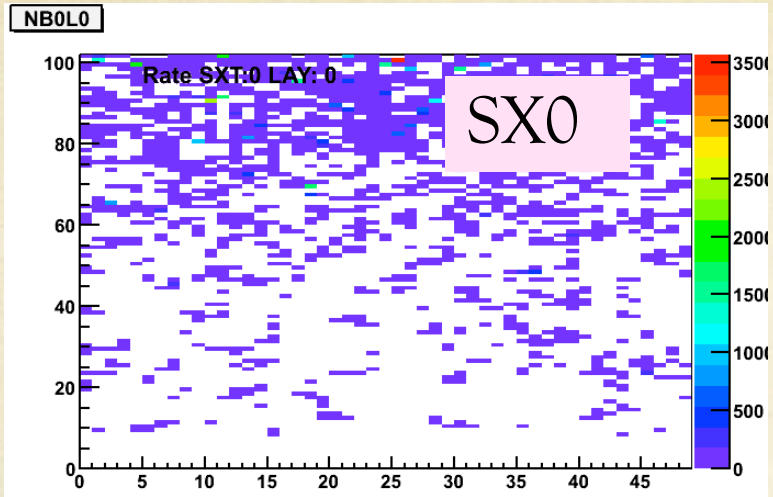
Backward Endcap

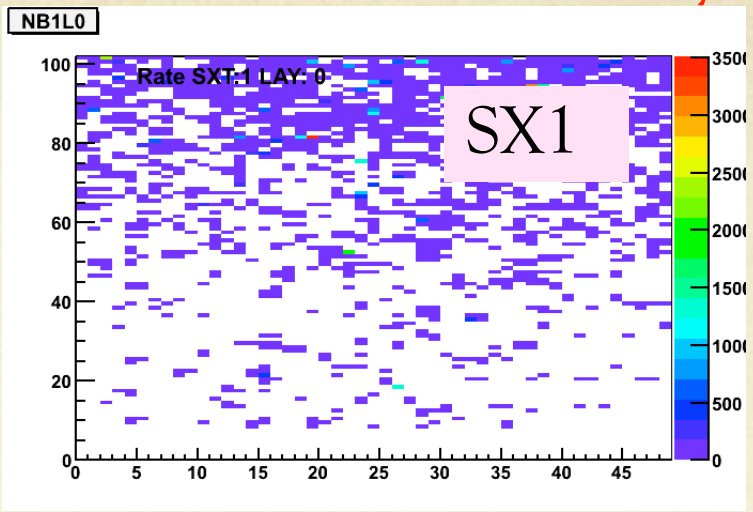


Forward Endcap

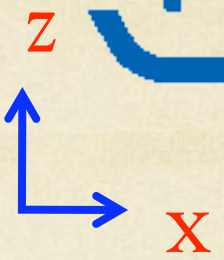


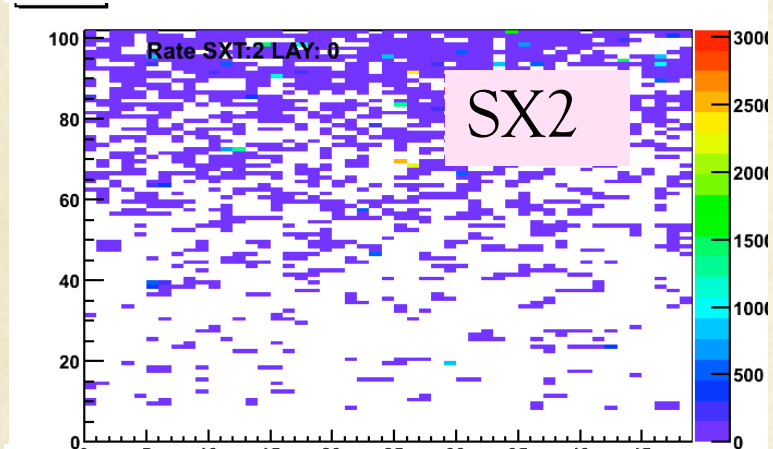
Rate for Neutrons for Touschek events Layer0: Barrel

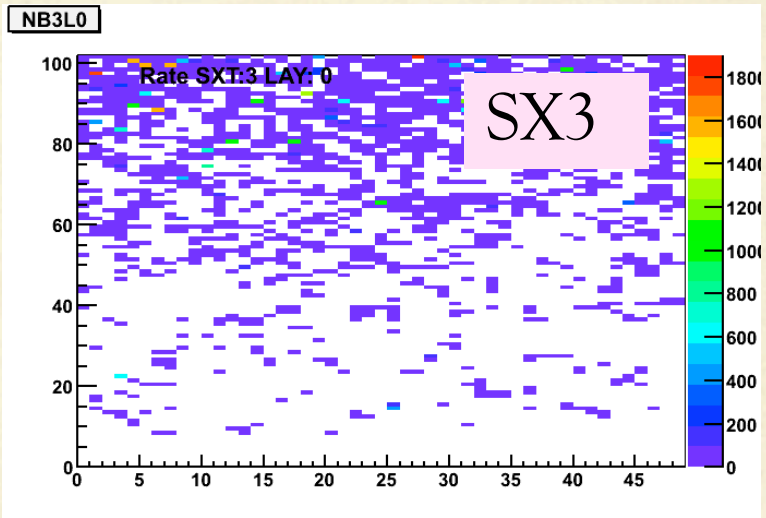




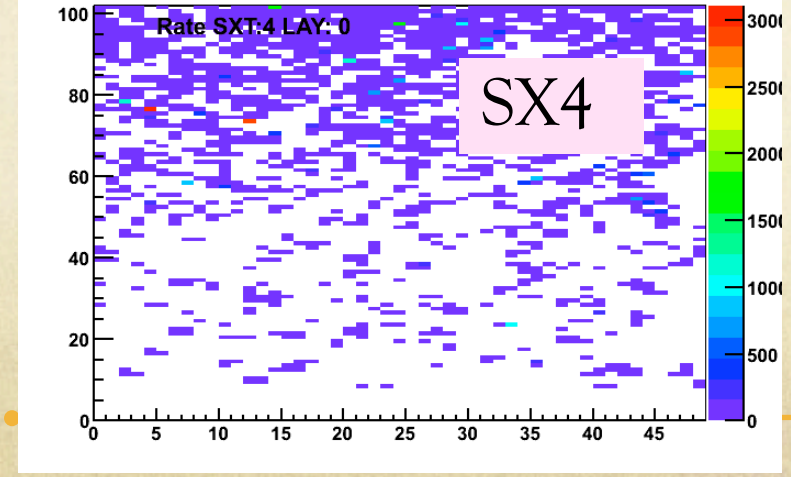
Hz/cm^2

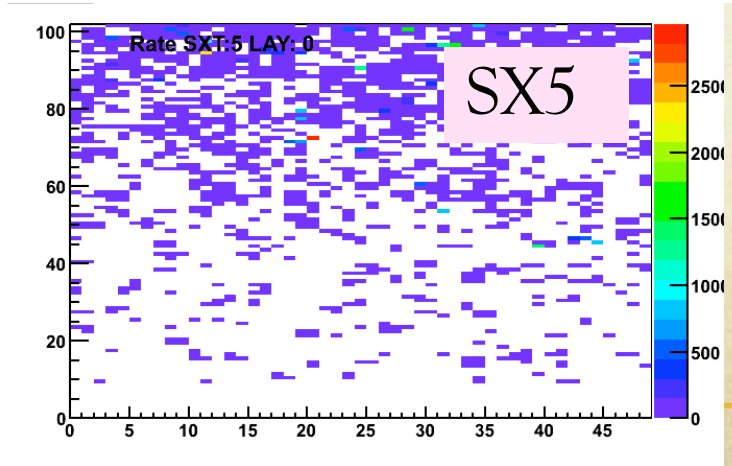


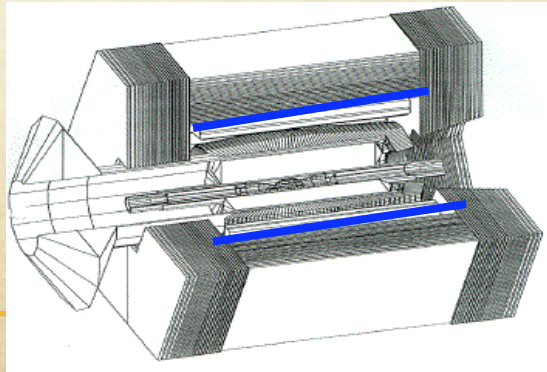




Normalized to 1MeV energy



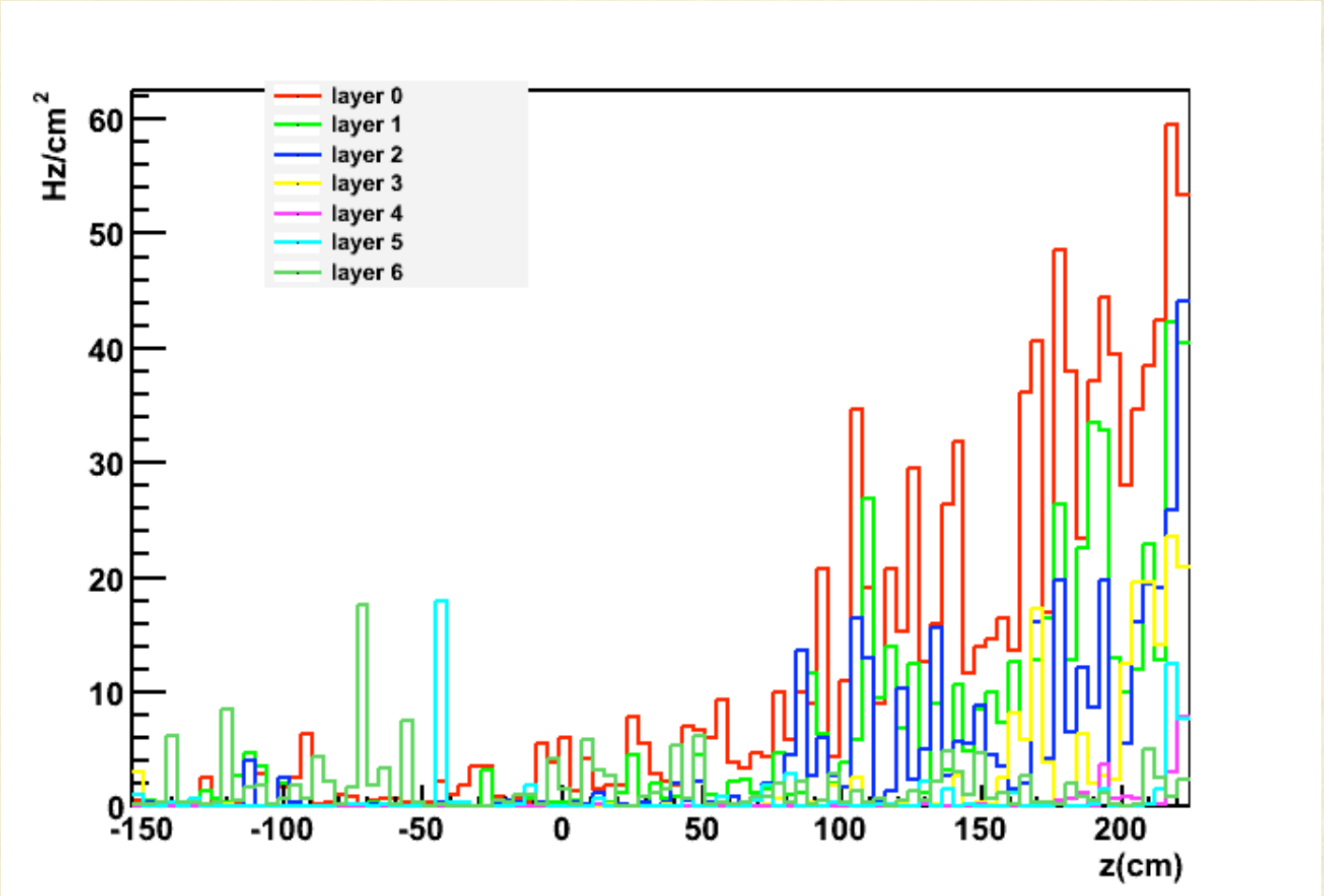




Neutron Rate for different layers for Touschek events:

Barrel

Rate vs Z-coordinate



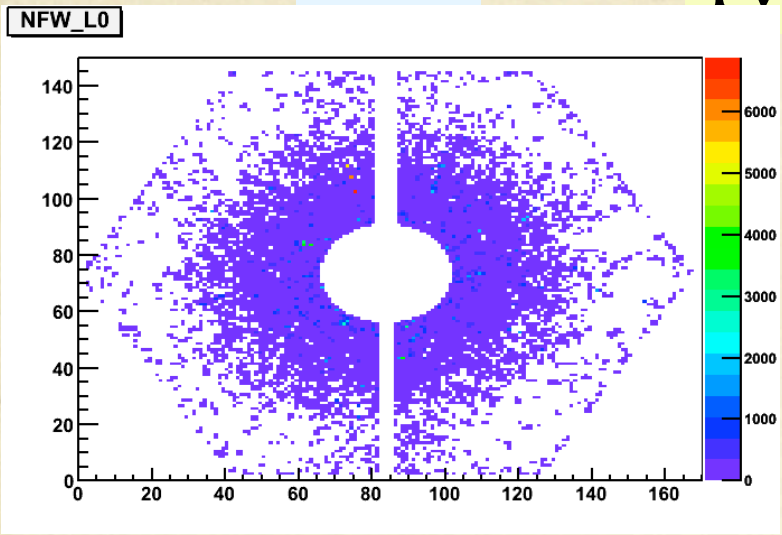
Maximum Rate around 60 Hz/cm^2 very low compared to BhaBha (450 Hz/cm^2)

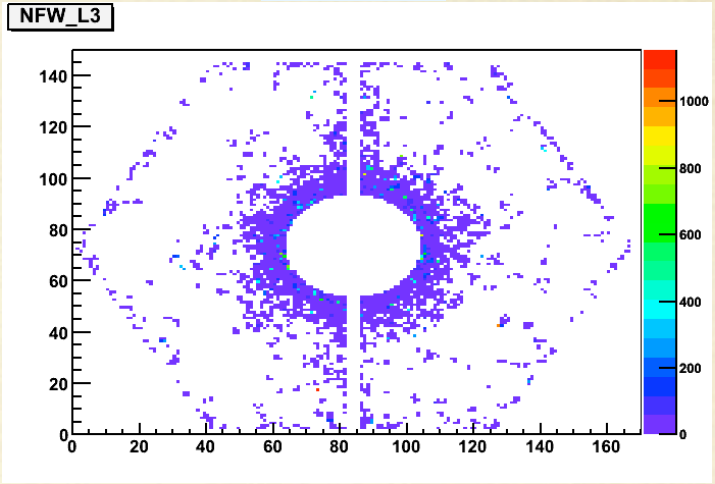
Neutrons rate: FWD Endcap Touschek events

L0

FWD ENDCAP

L3

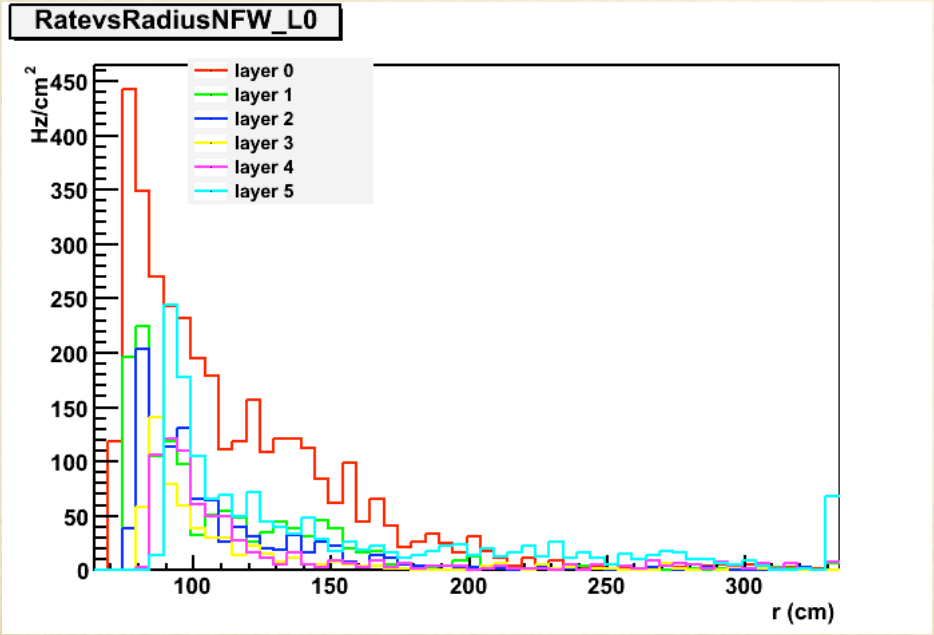


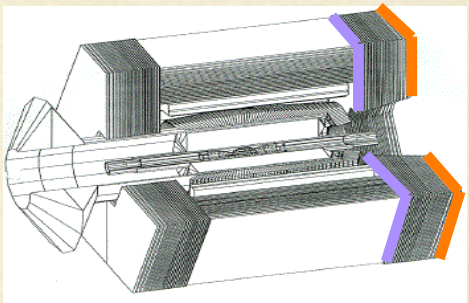


y

x

Rate vs Radius for FWD Endcap for Different layers





Normalized to 1MeV energy

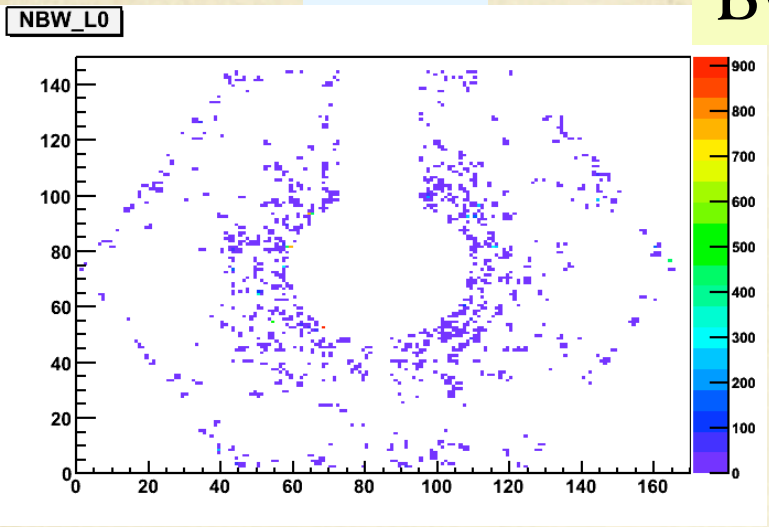
Rates around 450 Hz/cm^2 ≈1/10 of BhaBha rates in the same location)

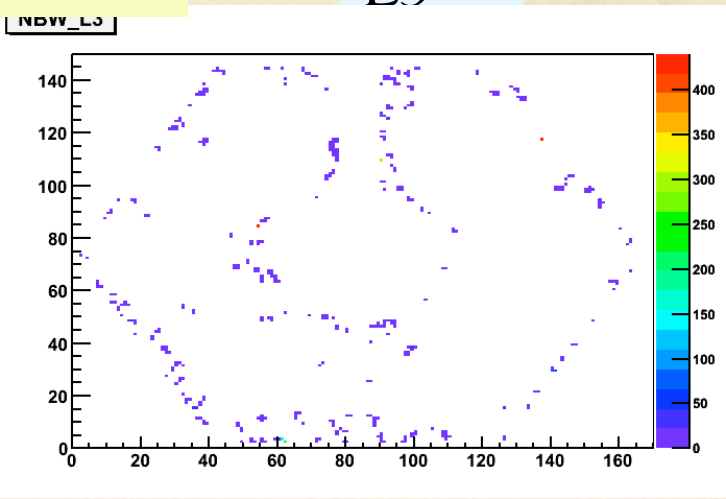
Neutrons rate: BWD Endcap Touschek events

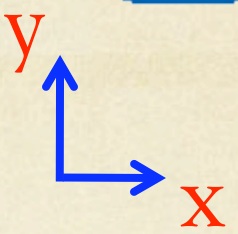
L0

BWD ENDCAP

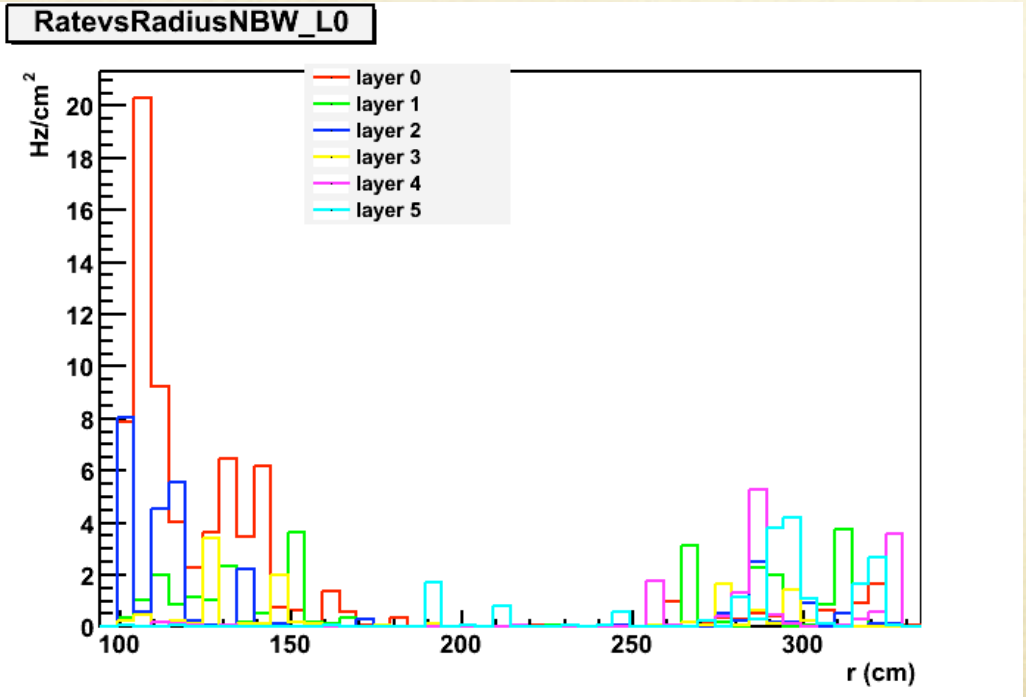
L3

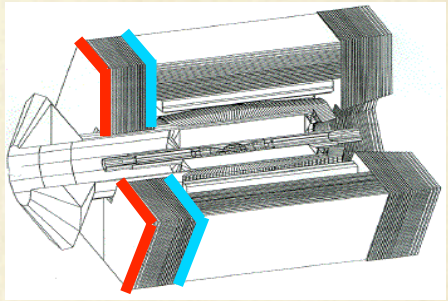






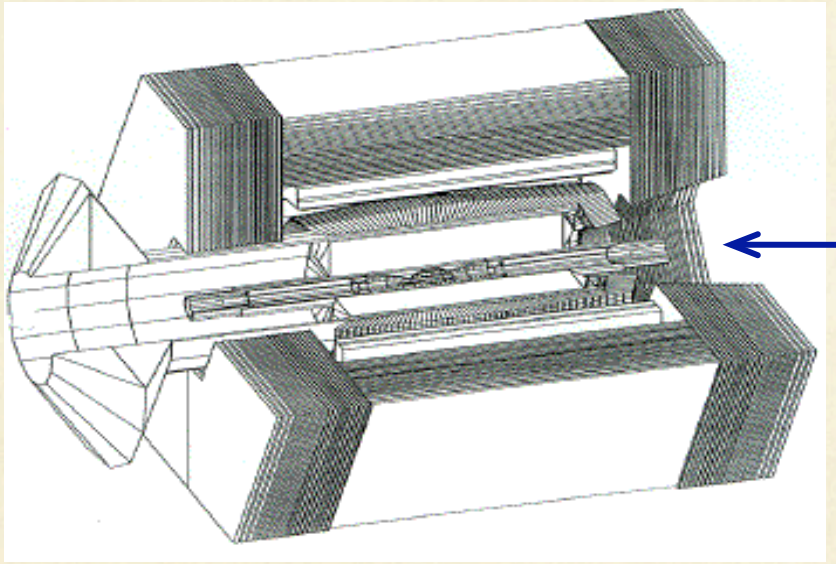
Rate vs Radius for BWD Endcap for Different layers





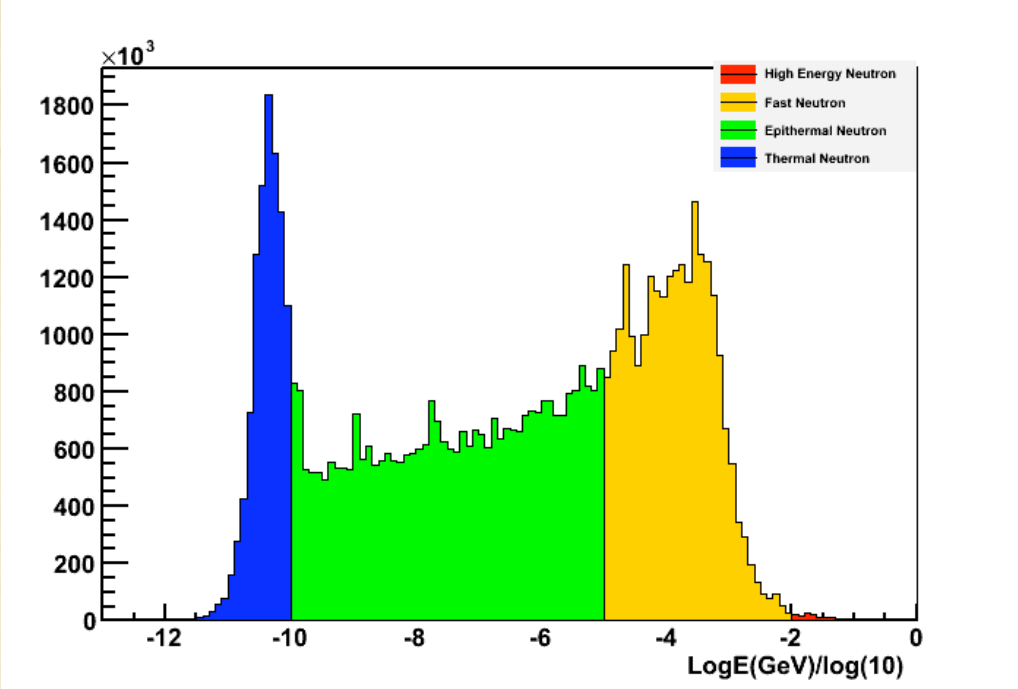
Normalized to 1MeV energy

Touschek events LER



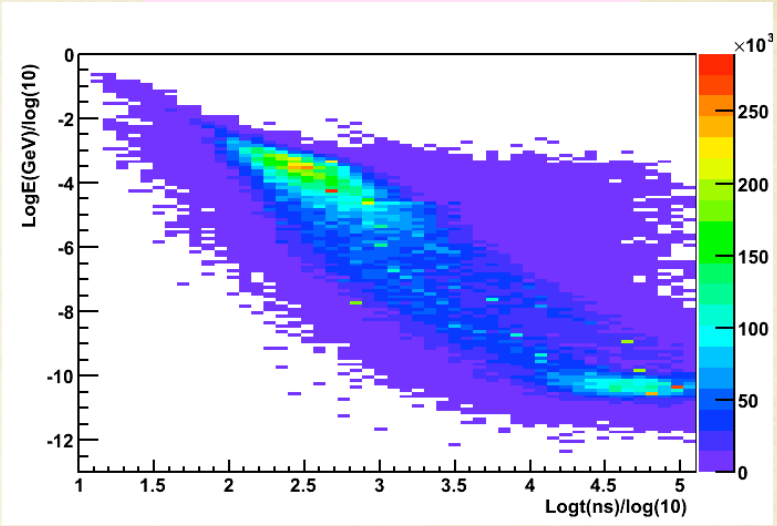
Neutron Energy Distributions for Touschek LER events

Barrel

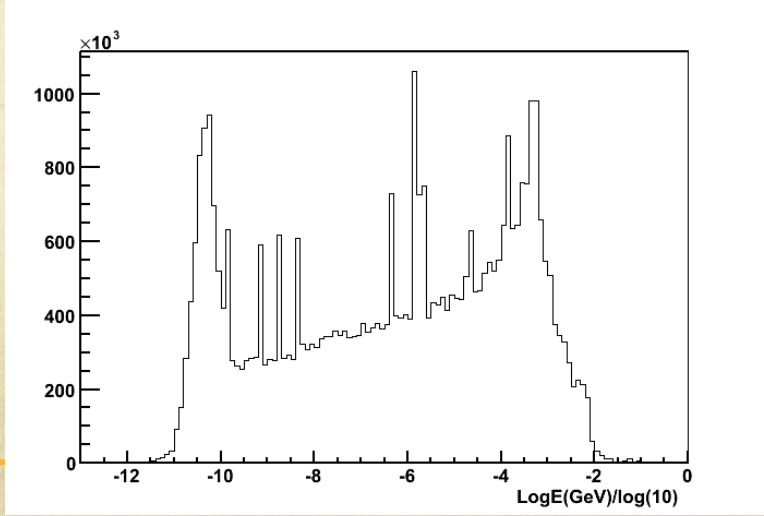


Barrel

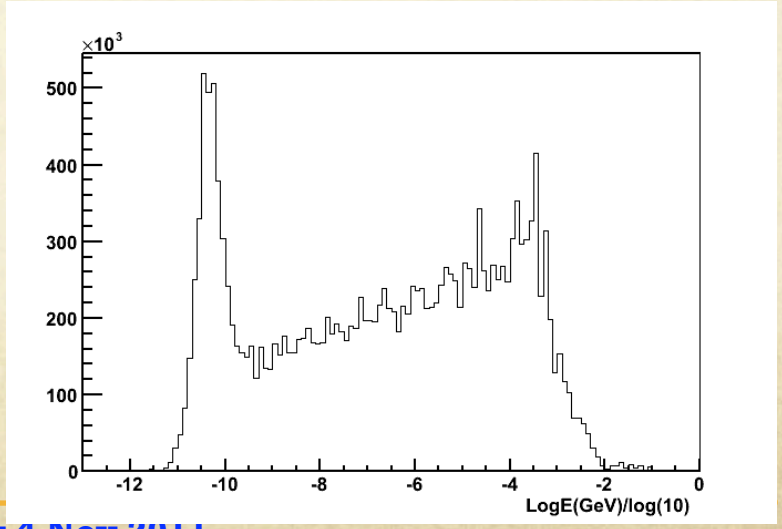
Energy vs time distributions



Backward Endcap

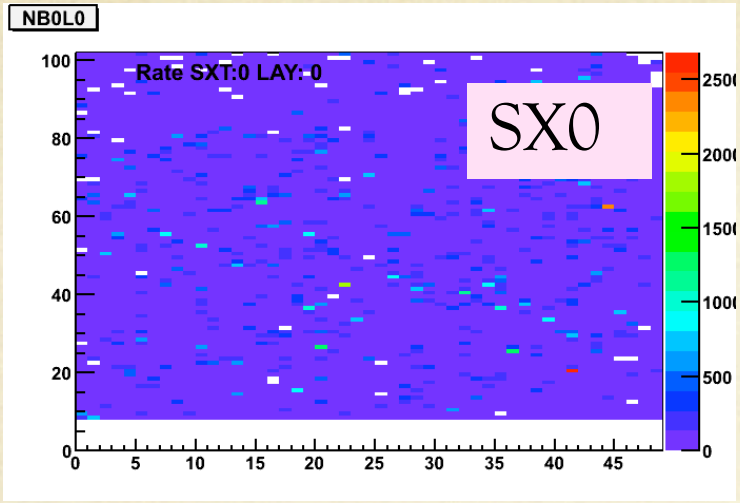


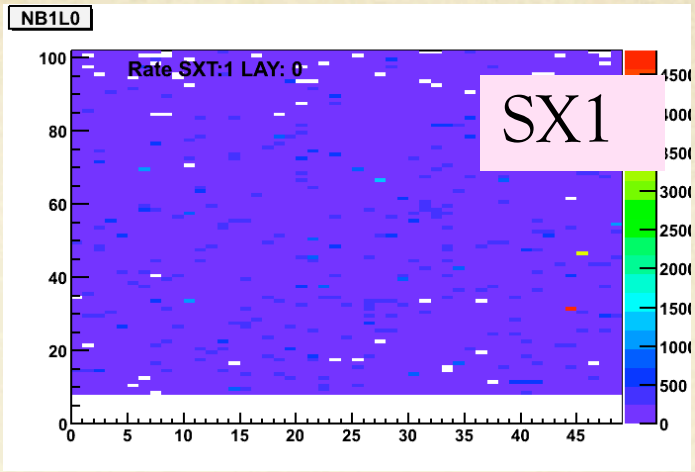
Forward Endcap

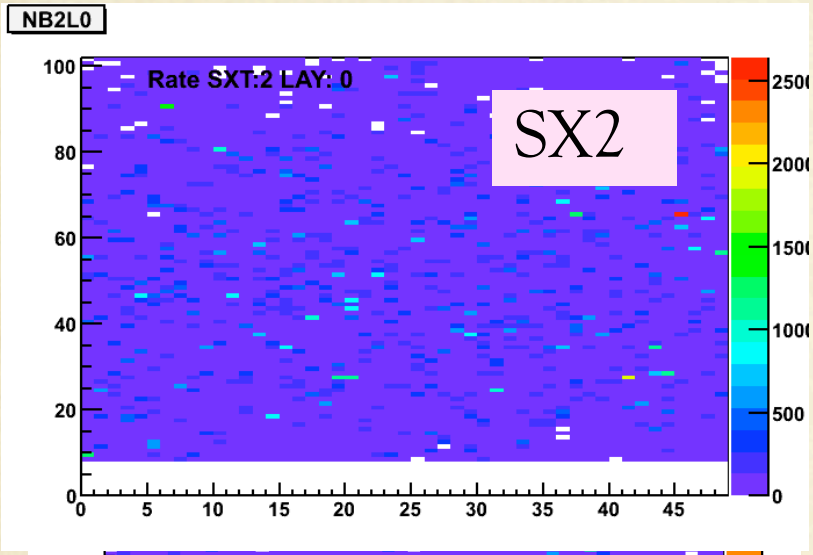


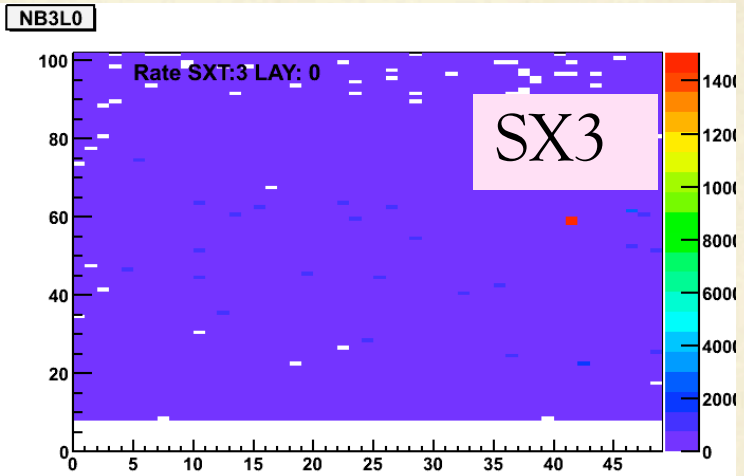
Rate for Neutrons for Touschek events Layer0: Barrel

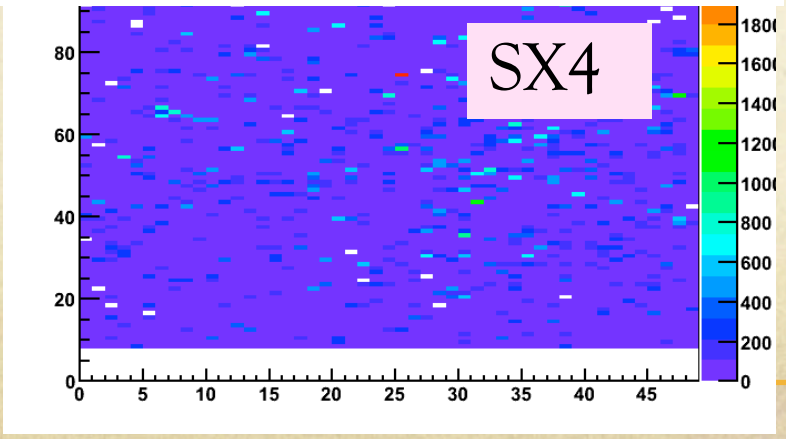
Hz/cm^2

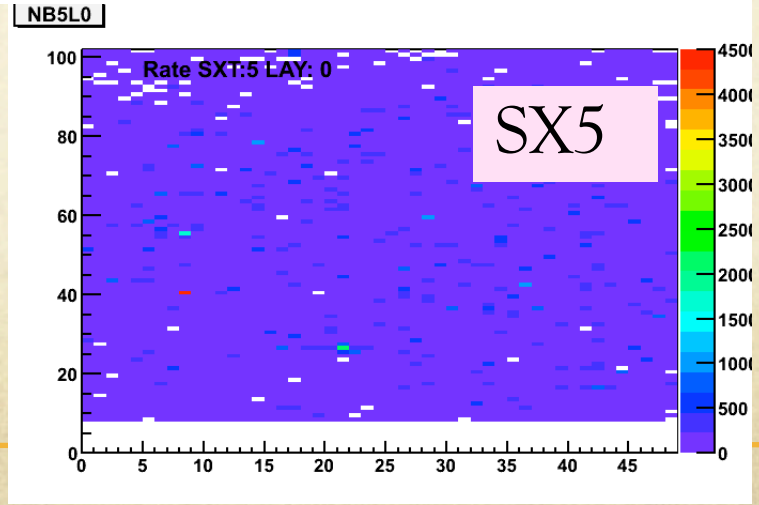


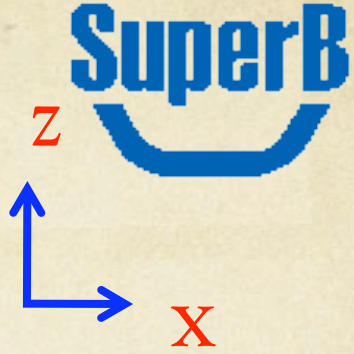




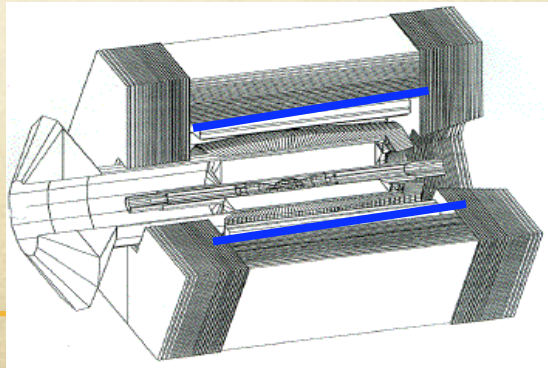




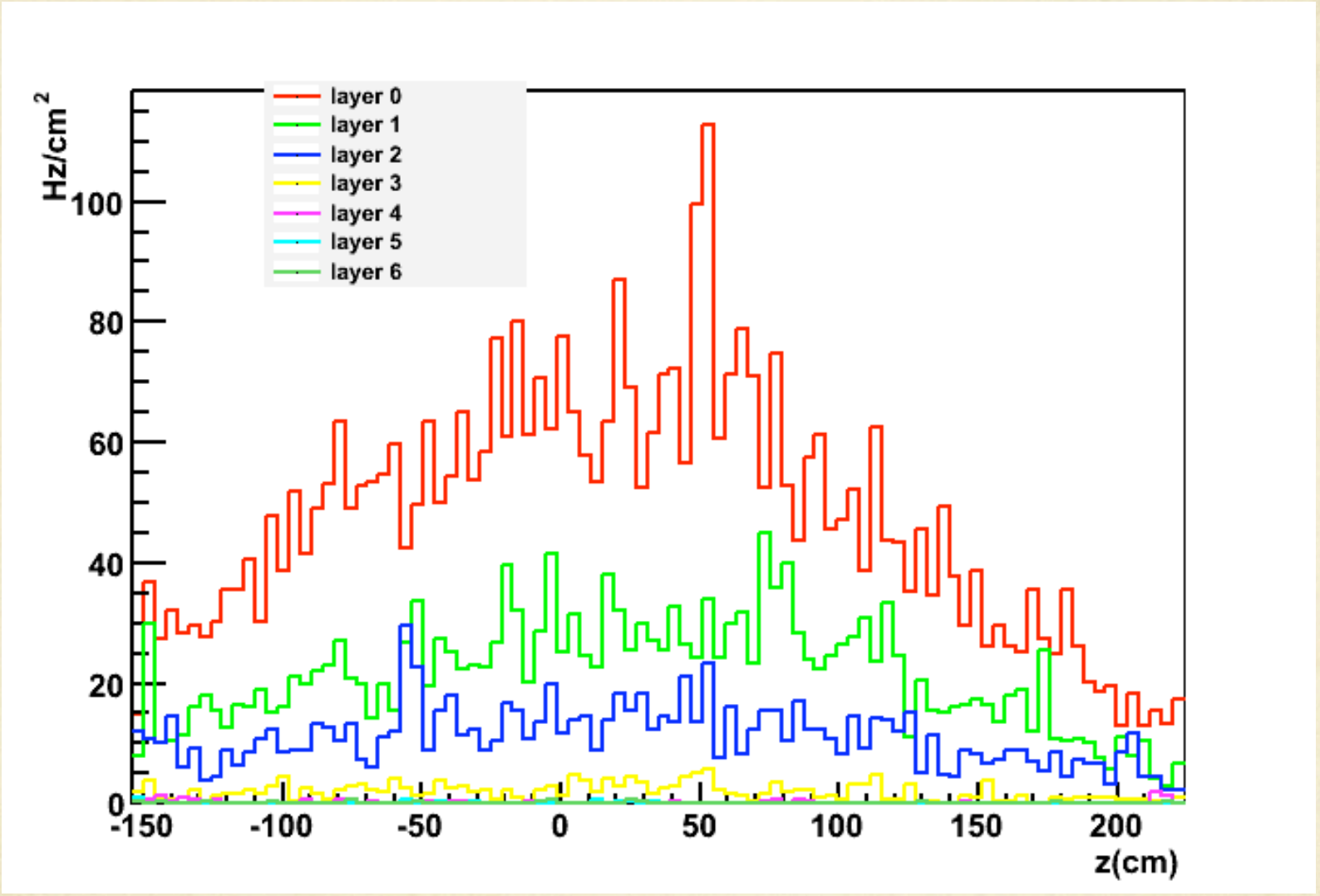




Normalized to 1MeV energy



Rate vs Z-coordinate



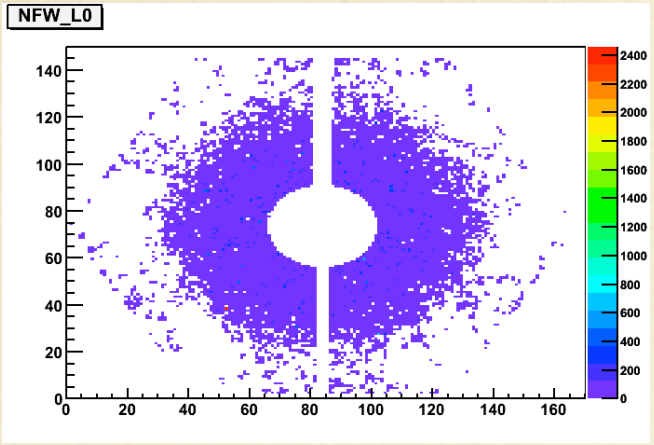
Rates for LER are higher than for HER but still small compared to BhaBha

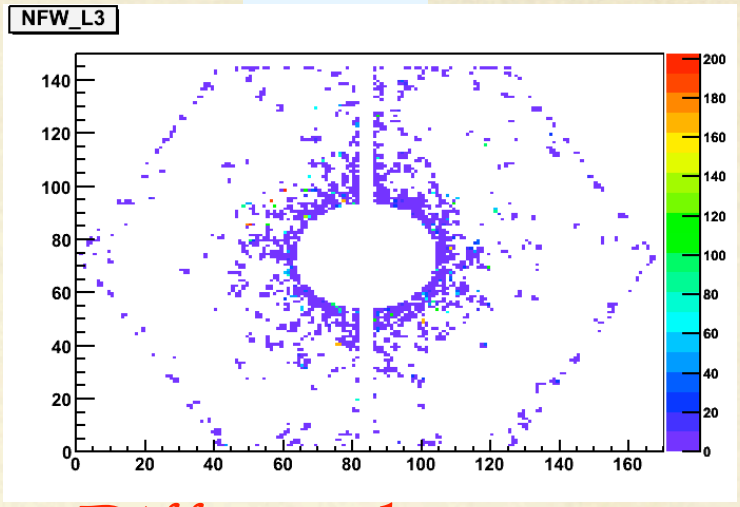
Neutrons rate: FWD Endcap Touschek events

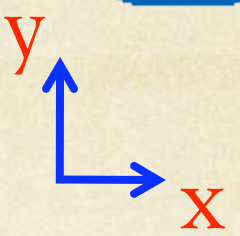
L0

FWD ENDCAP

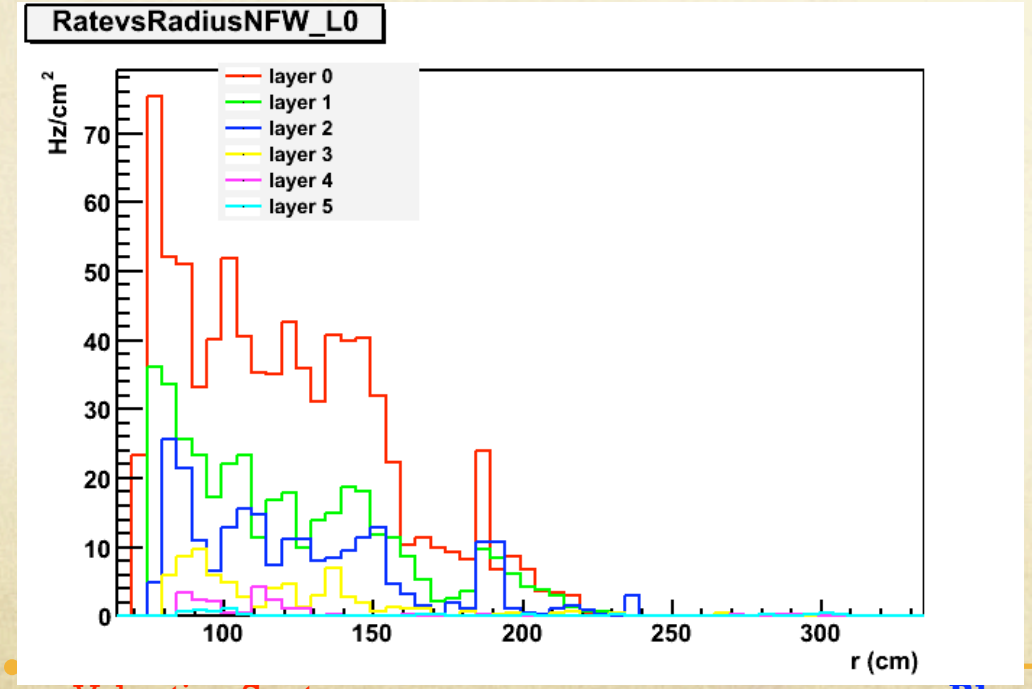
L3

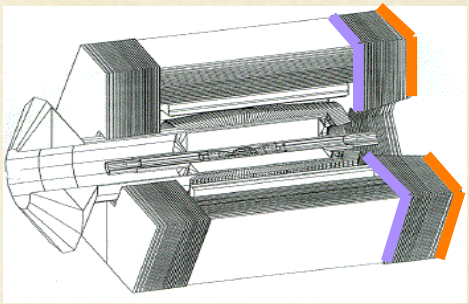






Rate vs Radius for FWD Endcap for Different layers





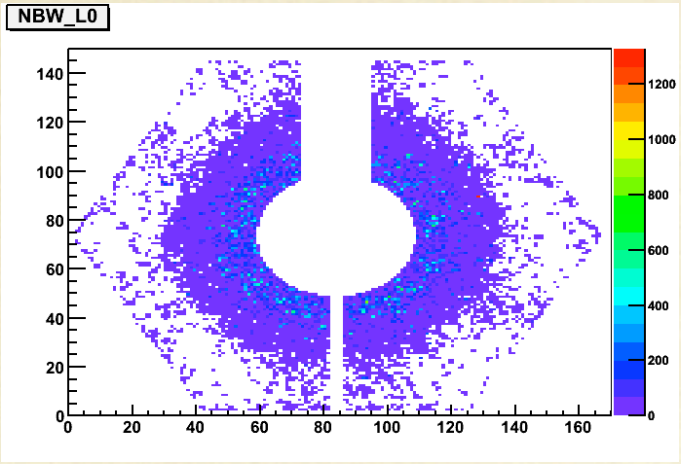
Normalized to 1MeV energy

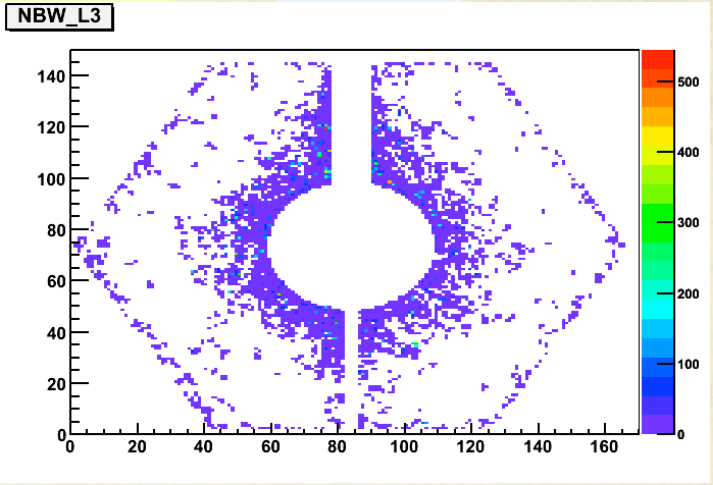
Neutrons rate: BWD Endcap Touschek events

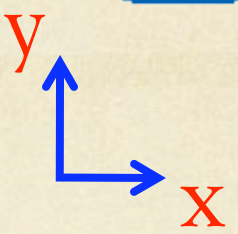
L0

BWD ENDCAP

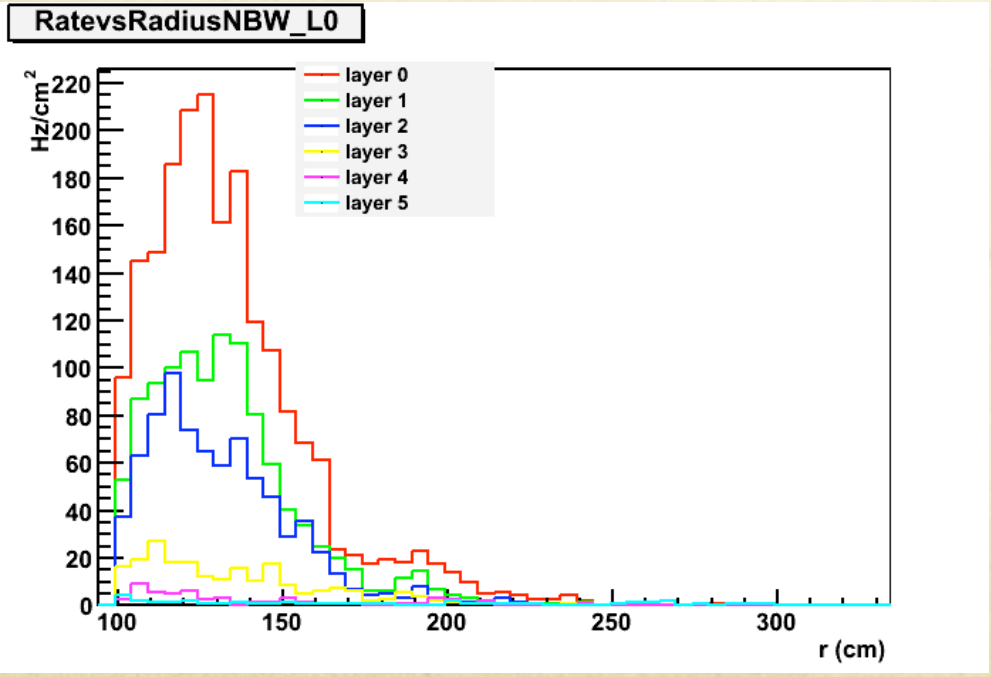
L3

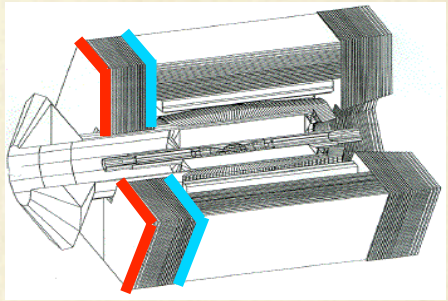






Rate vs Radius for BWD Endcap for Different layers





Normalized to 1MeV energy

Summary on Touschek studies

- ✓ Touschek background studied for the HER and LER
- ✓ Results for the HER and LER show that the rate are small compared to the BhaBha one.