

# Rad-bhabha bg-frames production Update

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# Outline

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- **Rad-bhabha bg-frames production**
  - The problem
  - Approach to solve the problem
  - Results
- **Schedule**
- **Summary**

# Rad-bhabha bg-frame production

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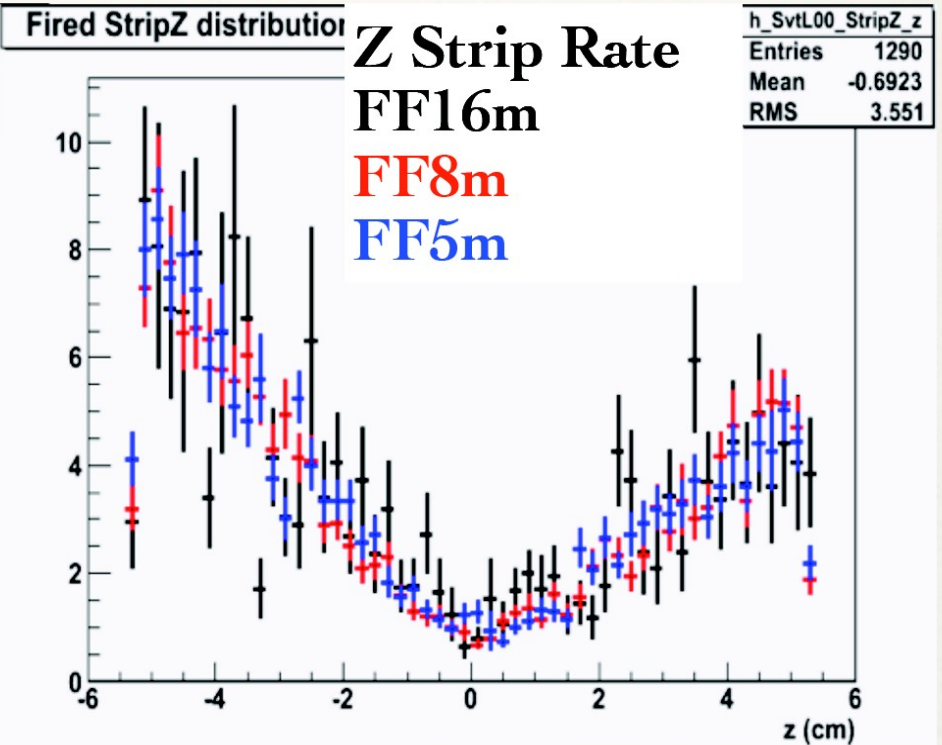
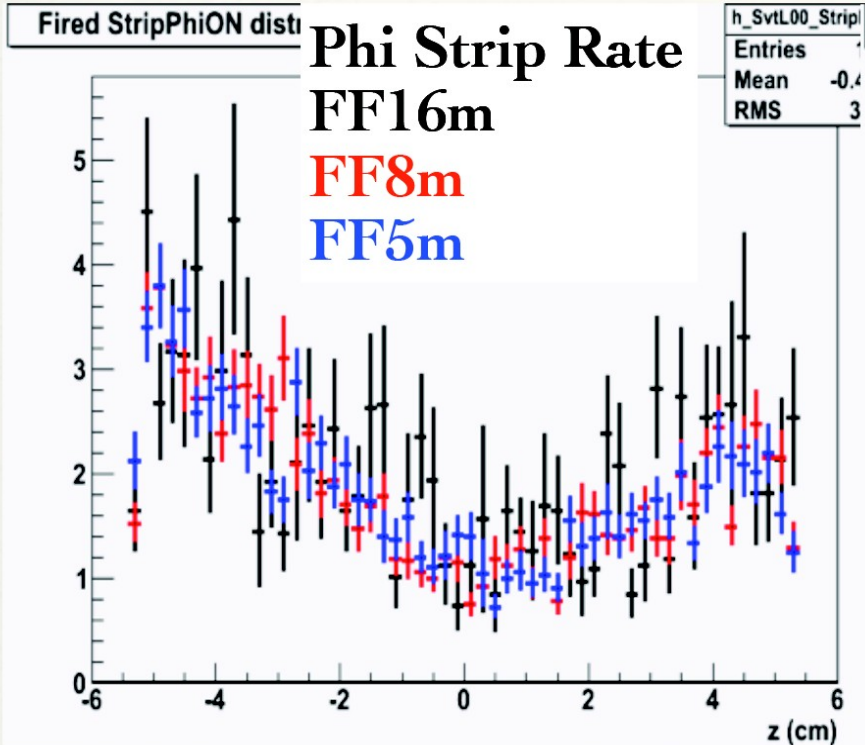
- **Current final focus (FF) model in FullSim is very complete, it covers from -16m to 16m**
  - Rad-bhabha simulation takes ~10min per event
  - Impossible to produce the rad-bhabha bg-frames request of 1M events in a reasonable time
- **Approach to the problem:**
  - The reason of the long FF model is to have a realistic estimation of neutron rates on the subsystems (FDIRC, IFR, EMC)
  - FastSim doesn't have a good simulation for neutrons
  - Propose to build reduced version of the FF:  $\pm 8\text{mts}$  and  $\pm 5\text{mts}$
  - Run a small fullsim production with the reduced versions of the FF
    - Compare background rates on different subsystems for the different FF models: nominal ( $\pm 16\text{mts}$ ) and reduced ones ( $\pm 8\text{mts}$  and  $\pm 5\text{mts}$ )

**If rates are similar  $\Rightarrow$  can use the reduced FF for the bg-frame production**

# Comparison of different FF models: SVT

## Results SVT:

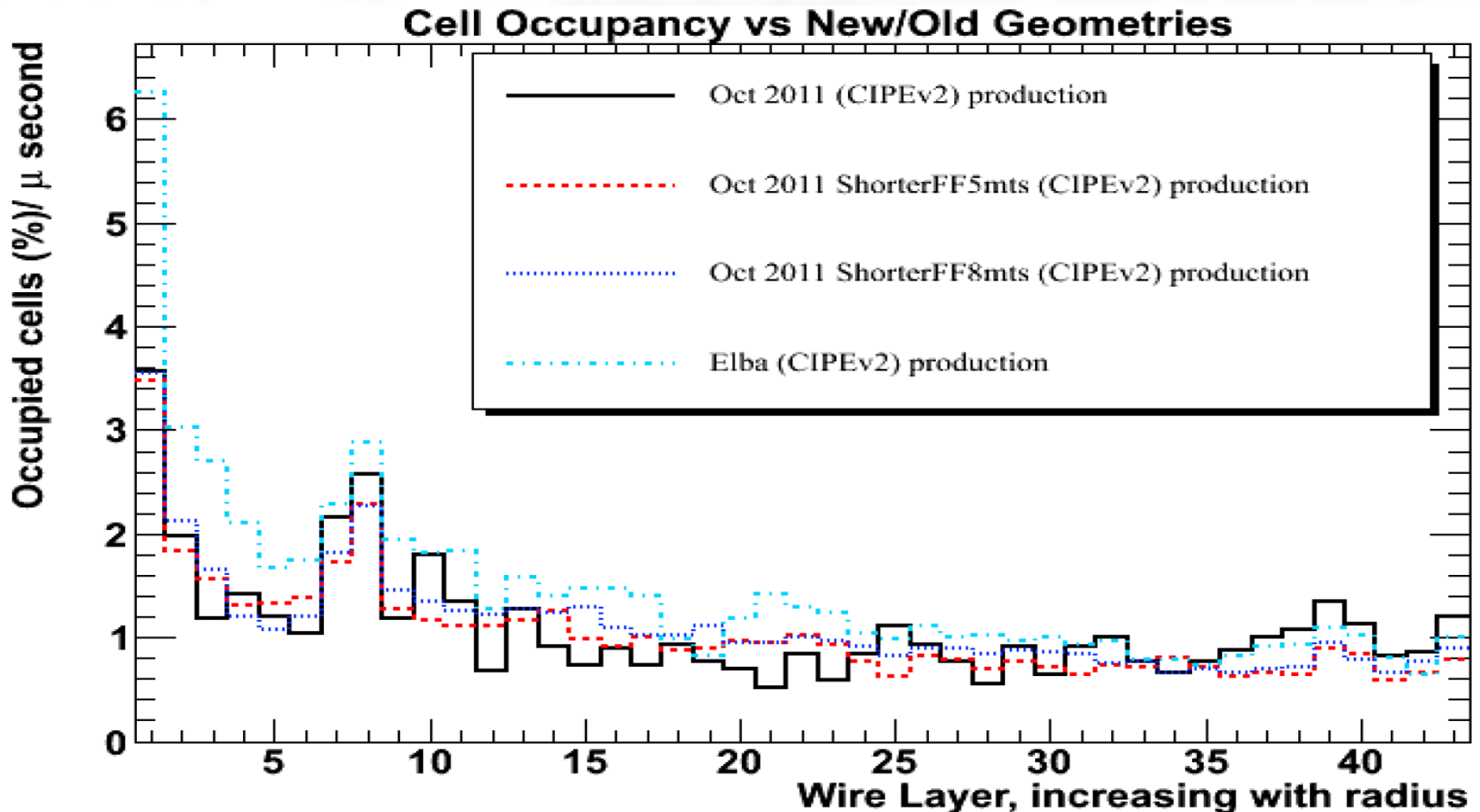
No Significant differences in rates



# Comparison of different FF models: DCH

## Results DCH:

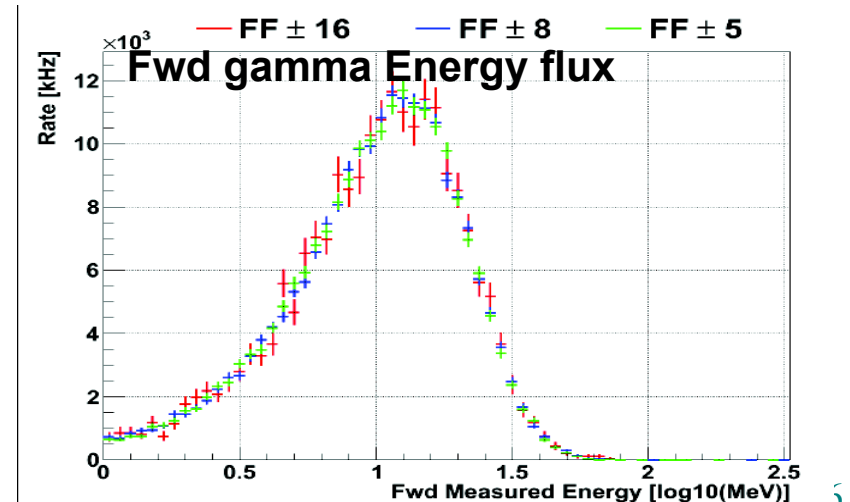
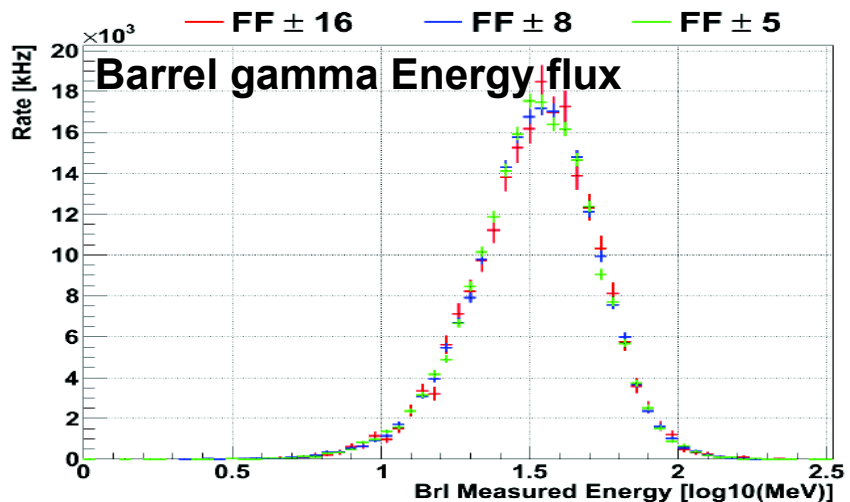
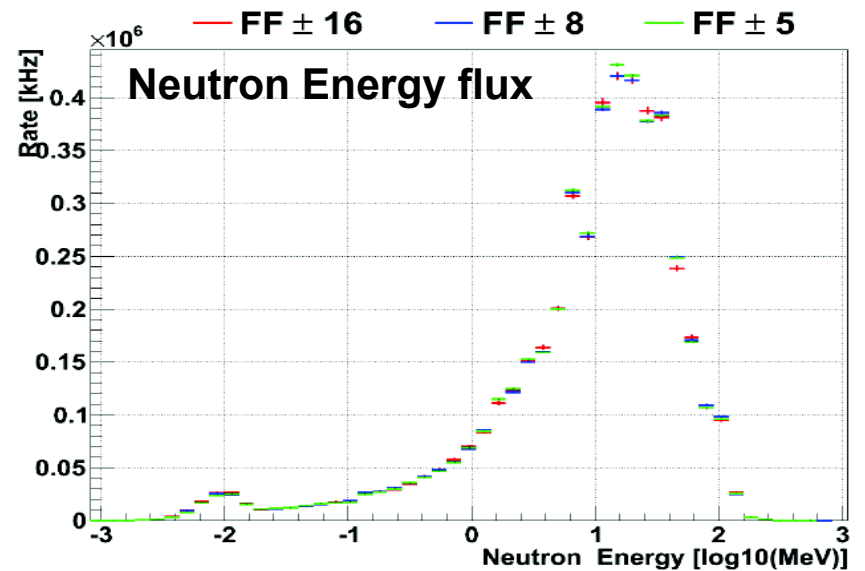
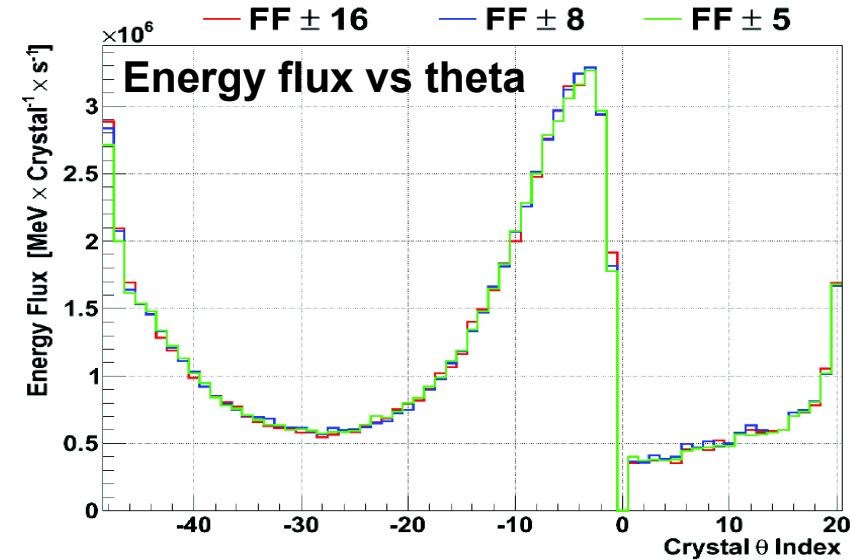
No Significant differences in rates



# Comparison of different FF models: EMC

## Results EMC:

No Significant differences in rates



# Comparison of different FF models: IFR (I)

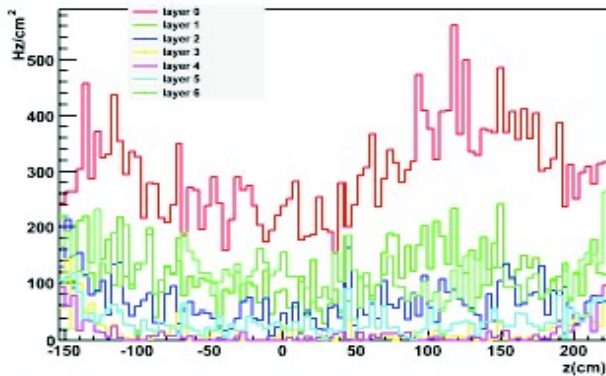
## Results IFR:

### Neutron Rate for Barrel for different FF simulations

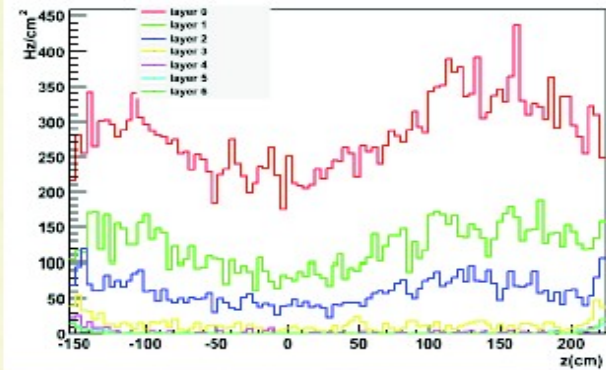


### Rate vs Z-coordinate

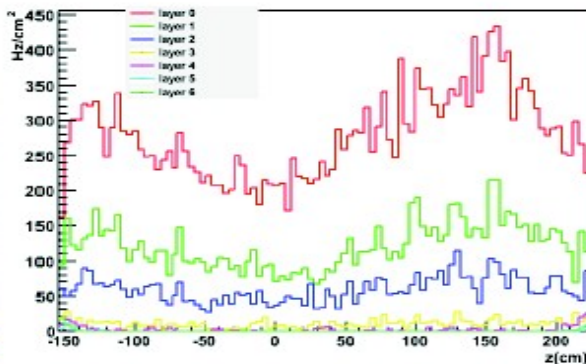
(FF) from -16 to 16 m from the IP.



(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  $\approx 25\%$

- layer 0
- layer 1
- layer 2
- layer 3
- layer 4
- layer 5
- layer 6

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# Comparison of different FF models: IFR (II)

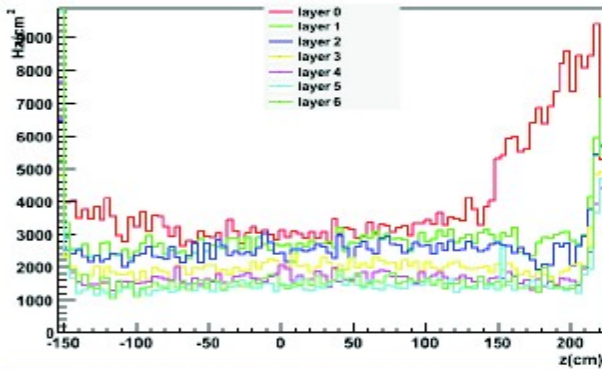
## Results IFR:

### Photon Rate for Barrel for different FF simulations

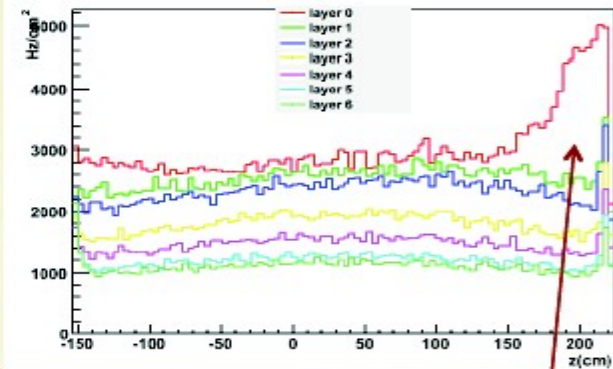


#### Rate vs Z-coordinate

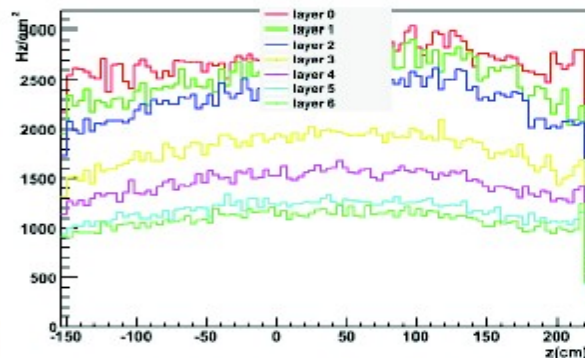
(FF) from -16 to 16 m from the IP.



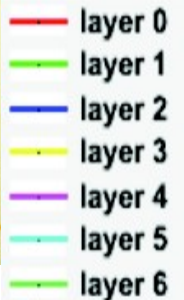
(FF) from -8 to 8 m from the IP.



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



Rates at high-z change dramatically for photons



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# Comparison of different FF models: IFR (III)

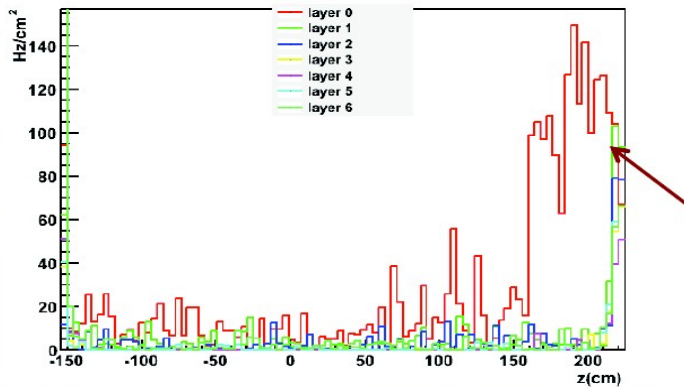
## Results IFR:

### Electron Rate for Barrel for different FF simulations

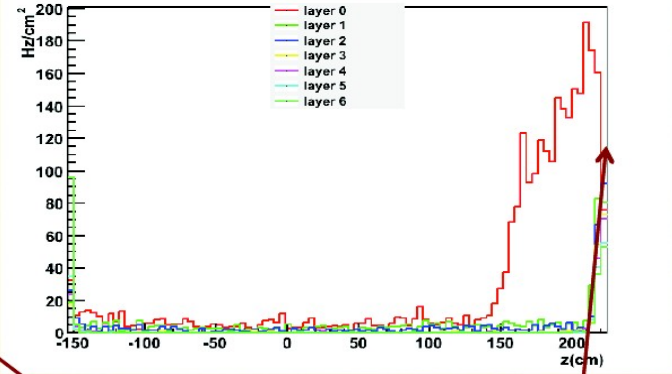
#### Rate vs Z-coordinate



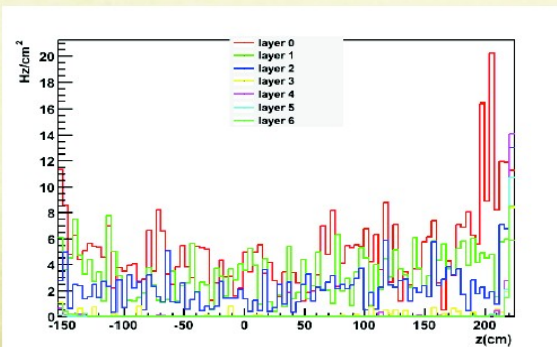
(FF) from -16 to 16 m from the IP.



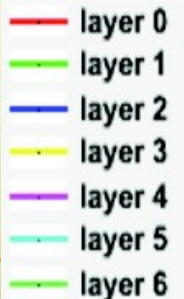
(FF) from -8 to 8 m from the IP.



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



Rates at high-z change dramatically for electrons



# Comparison of different FF models: Interpretation

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- Most of the subsystems see very similar rates for the different FF models
- Only the IFR sees different rates. Can we live with this?
- The reduced FF model ( $\pm 5$ mts) is the only approach we (the FullSim group) can offer to generate in a reasonable time scale the requested 1M events of Rad-bhabha bg-frames
  - ⇒ **The reduced FF model of  $\pm 5$ mts have a factor of 10 lower execution time per event w.r.t. the nominal FF model ( $\pm 16$ mts)**

# Rad-Bhabha bg-frames prod. Schedule

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- **Found a little problem with the FullSim bg-frame production code**
- **Will produce a new FullSim release by tomorrow**
- **Productions request:**
  - Rad-bhabha (fullsim): 10k events (1 day)
  - Pairs (sullsim): 100k events (1 day)
  - Rad-bhabha (bg-frames): 1M events (4-5 days)
- **Schedule:**
  - Pre-production (10% of total request):
    - Start as soon as possible the new release is created
    - Expect to be finish in a couple of days
    - Will proceed with full production as soon as analyst sign-off the physics quality of the pre-production
- **If everything goes smoothly, expect to finish fullsim production by the end of the Nov. Beginning of December**

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**Backup**