

Electron and Pion Rates Related to Pion Detection Studies

Yufan Chen and Neven Simicevic

Second pass of study of electron and pion rates related to pion detection were done using FLUKA:

1. We checked that FLUKA has all the relevant physics channels.
2. We used the kinematics for forward and backward electron detections as reported on September 12, 2011 and shown in Figure 1.
3. We used LH target of length 150 cm.

Results:

1. We found the total rate of forward electrons 106 GHz and backward electrons 120 GHz, for a total of 226 GHz, compared to “rate of more than 150 GHz available” in the September 12, 2011 report.
2. We found the rates of pions of $4.8 \cdot 10^{-3}$ and $1.8 \cdot 10^{-2}$ GHz in same kinematical region assuming pion mass zero (so this report can be ready by 3 pm Central Time).
3. We found pion/electron ratio of 0.01% compared to “measured to be 0.12% in the Møller detector” in the September 12, 2011 report.

Pass three:

1. Improve solid angle binning.
2. Find out the reason for forward and backward electron rate being different (106 GHz compared to 120 GHz).
3. Separate electron reaction channels.
4. Increase statistics.
5. Find out the reason for pion/electron ratio discrepancy.

Because of a stupid mistake we lost 90% of our data so the statistic is low, particularly for pions, and we cannot report on muon rates.

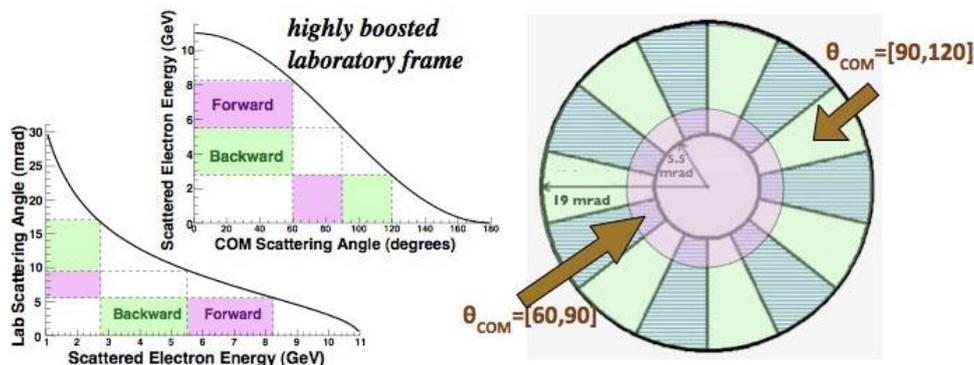


Figure 1. Kinematics

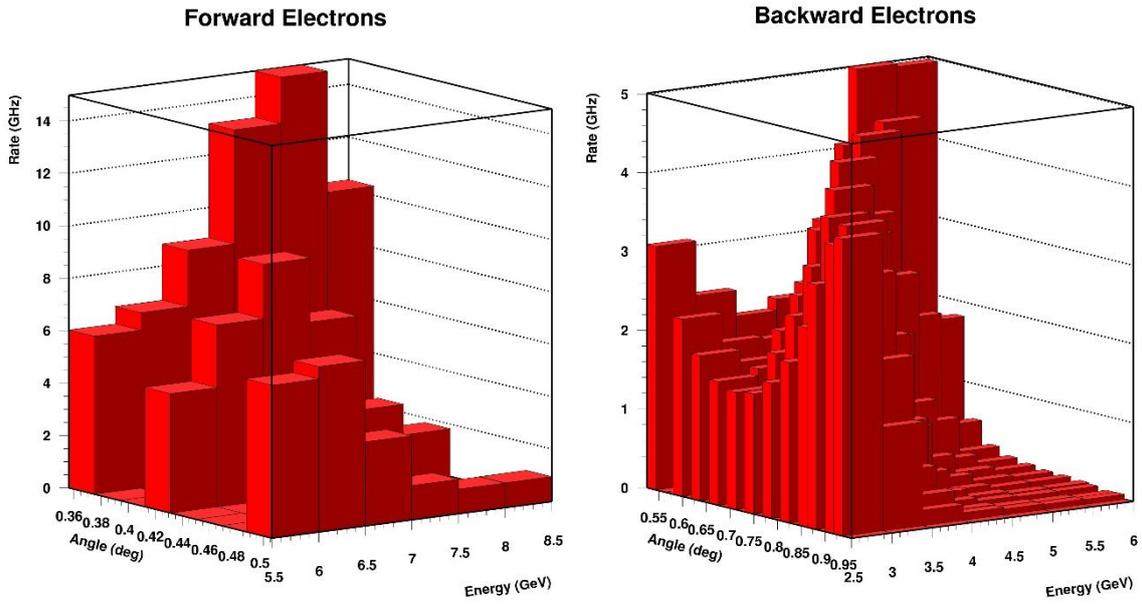


Figure 2. Electron Kinematics

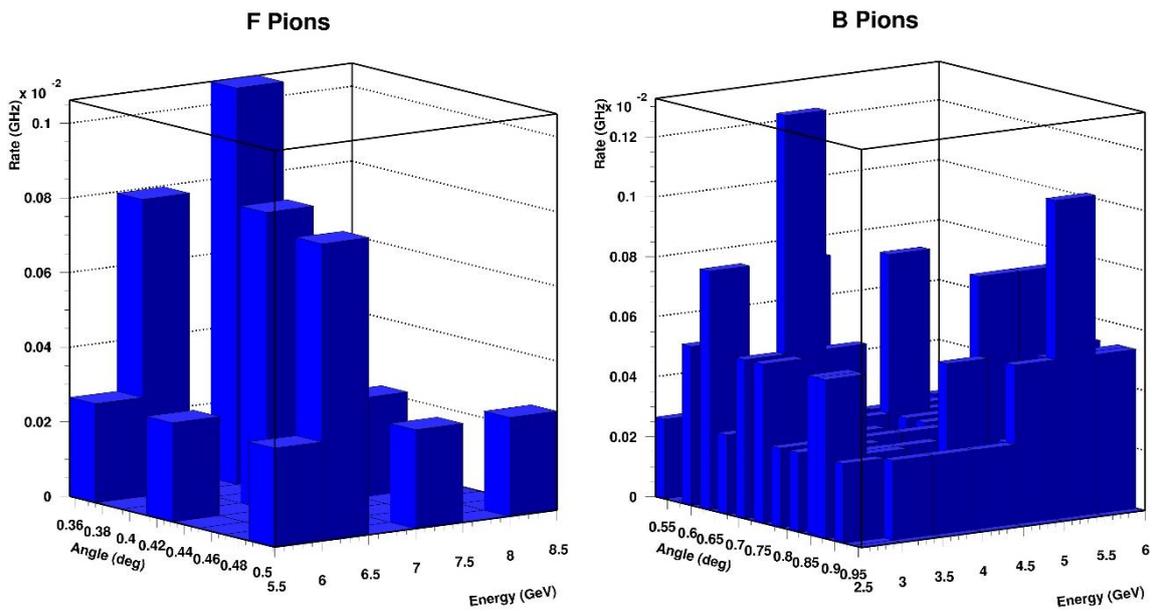


Figure 3. Equivalent Pion Kinematics