# Status of Top studies

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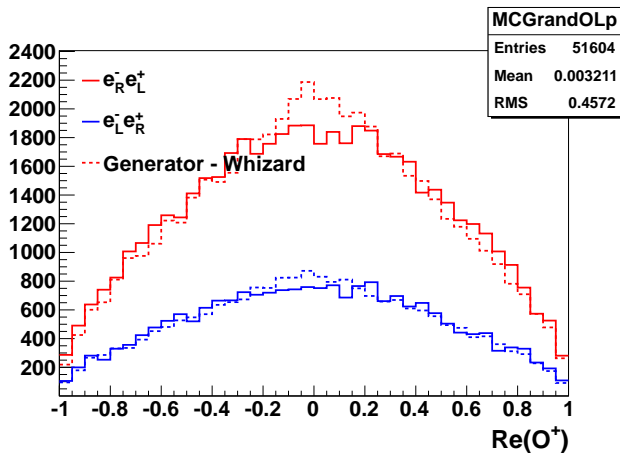
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Outline
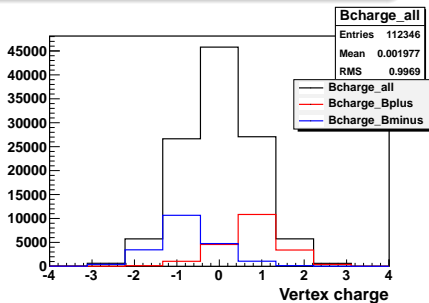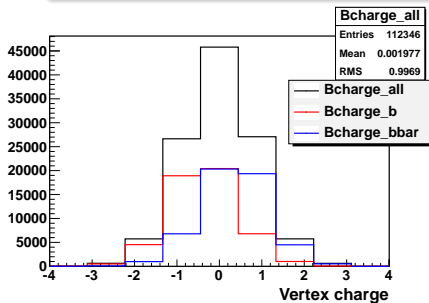
Update on CPV



Nacho send me an updated version of the Valencia note, and now the distribution and the value seems in good agreement.
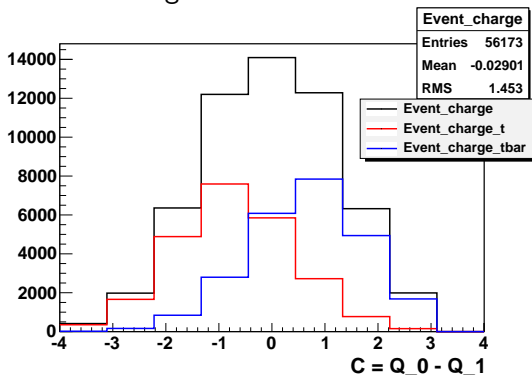
B charge measurement

1. Use LCFIPlus to measure the charge of the Vertex.
2. Thanks to Amjad's help.



Vertex charge measurement for the b quarks and the B's mesons.

The event charge



1. Event charge: charge b1 - charge b2
2. With the event charge and the lepton charge we can know if we choose the good b for the top reconstruction.
3. Number of event for each case:
   - Good charge: 29181 (51.9%)
   - Bad charge: 12900 (23%)
   - No charge: 14092 (25.1%)
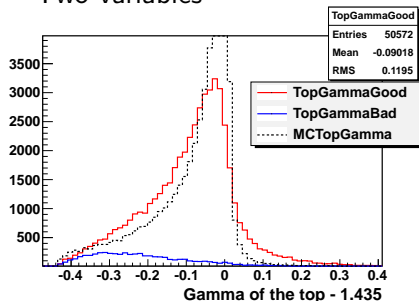
# Migration effect

Comes from top which are not reconstructed in the good hemisphere

What are these top events?
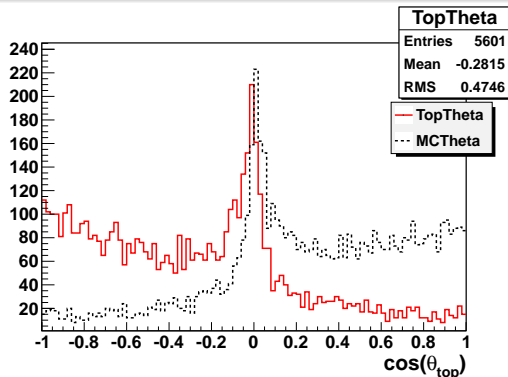


Angular distribution for the top which are not in the same hemisphere than the MC one.

## Two variables



$\gamma_{top}$ is lower for flipped top.

1. % of good combination for the reconstructed top in events with:
   - Good charge: 86.3%
   - Bad charge: 49.9%
   - No charge: 72.9%

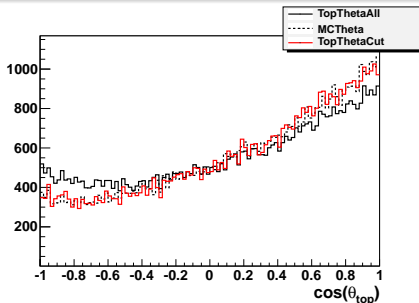2. Better good comb. rate for event with good charge or no charge.

Complementary variables which play on the number of good combination and of flipped top.

## Results

### Cut using the B charge

$\gamma_{top} - 1.435 > -0.2$ for top with the good event charge.
$\gamma_{top} - 1.435 > -0.1$ for top with a null event charge.



$A_{FB} = 31.56; Eff. = 30.8\%; \delta_{A_{FB}}/A_{FB} = 1.7$

Reminder with $\chi^2$ cut:
$A_{FB} = 32.63; Eff. = 28.5\%; \delta_{A_{FB}}/A_{FB} = 1.7$

Advantages

1. $A_{FB}^{MC}$ more robust to this cut:
   - $\gamma_{MCtop} - 1.435 > -0.2$ : $A_{FB}^{MC}$ $33.93 \rightarrow 36.43$; $Eff. = 87.6\%$.
   - $\chi^2 < 15$ : $A_{FB}^{MC}$ $33.93 \rightarrow 39.6$; $Eff. = 70.9\%$.
   - $\chi^2 < 1$ : $A_{FB}^{MC}$ $33.93 \rightarrow 43.1$; $Eff. = 28.5\%$.

2. Keep the kinematics variables of the reconstructed top in a good shape.

3. Become immediately more efficient with an optimize vertex charge measurement.

Conclusion

1. The B charge measurement is a promizing tool.
2. Using it to select the good events give the same results than the $\chi^2$ method but more "under control".
3. I use it to select the event, I may now try to use it the choose the combination to reconstruct the top.
4. Things to check: effect on background.