

# Bhabha Tracking Efficiencies

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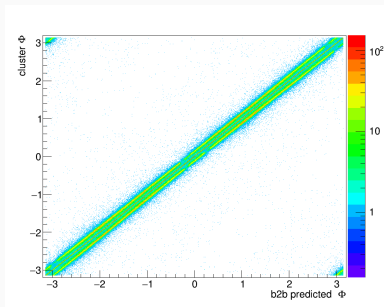
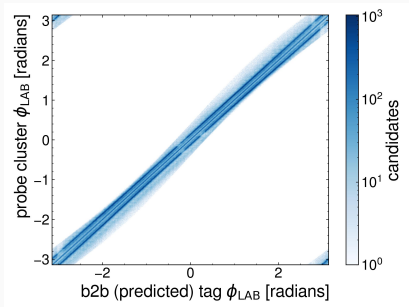
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# Getting Started

- I want to study the tracking efficiency of Bhabha processes
- For this I look at electrons which are only detected by the CDC.
- They are therefor labeled and treated as gammas
- Filling the gamma lists:
  - gamma:probe '(E > 0.1)'
  - gamma:tag '(clusterE > 3.0)'
  - vpho:cand 'reconstructed from gamma:probe and gamma:tag'
- What cuts do we need to do this? (Sam's email)
  - $0.296706 < \theta < 2.61799 \rightarrow$  It has to hit the CDC
  - $n\text{CleanedTracks}[\text{abs}(\text{dz}) < 2.0 \text{ and } \text{abs}(\text{dr}) < 0.5 \text{ and } n\text{CDCHits} > 0 \text{ and } \text{pt} > 0.15] < 1 \rightarrow$  bad quality hits
  - $M(\text{vpho}) > 8.0 \text{ GeV} \rightarrow$  To Cut away background (not from his email by surely he is using something like that)

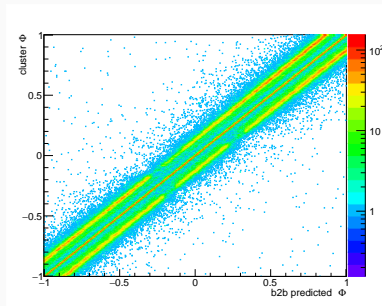
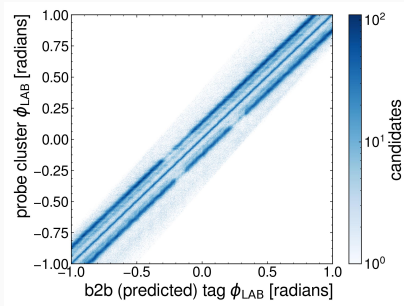
# Reproducing Plots

- Running on Data Prod6
- `/hsm/belle2/bdata/Data/release-02-01-00/DB00000438`  
`/prod000000006/e0003/4S/r02*/all/mdst.sub00/*.root`
- Sam's plots are on the left.
- Three lines. The middle one is  $\gamma\gamma$  the two others are  $ee$



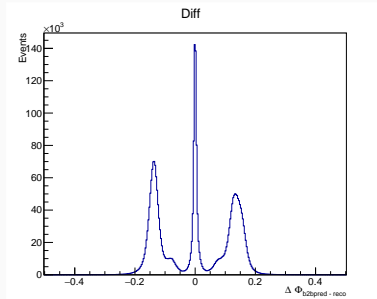
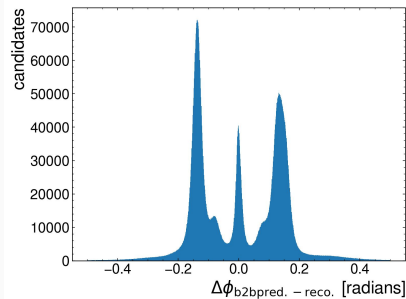
# Reproducing Plots

Same plots but zoomed in



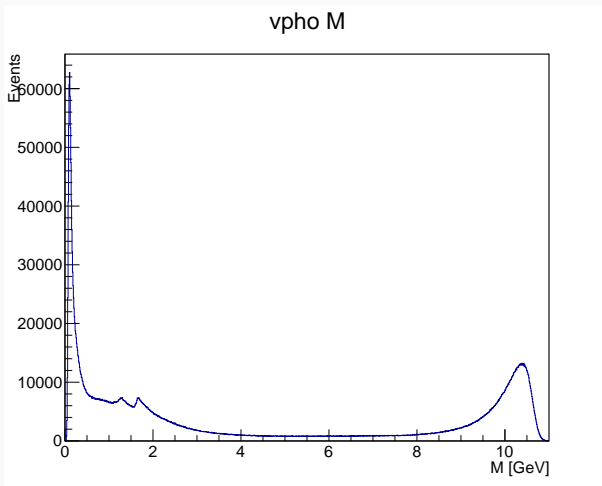
# Reproducing Plots

- The middle peak is  $\gamma\gamma$  the two other peaks are  $e e$
- My  $\gamma\gamma$  peak is way higher (Maybe different mass cut?)

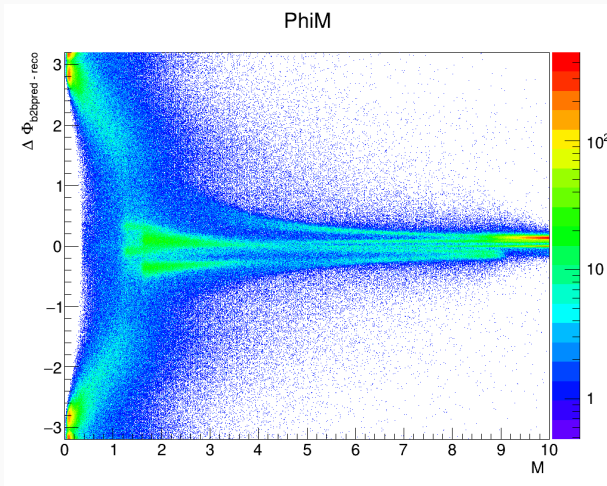


## Some more plots

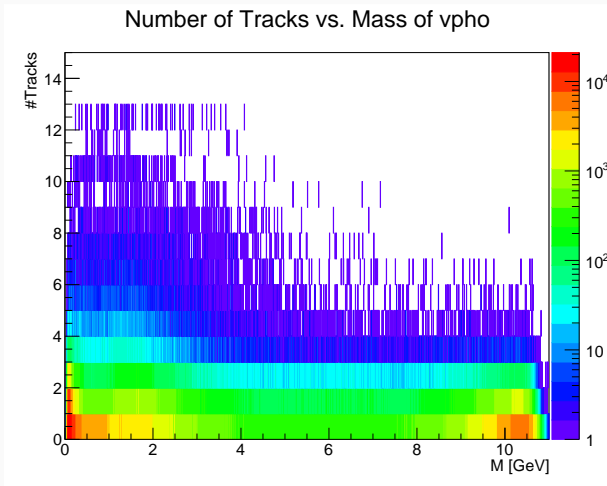
Here is no Mass cut on the  $\nu\text{pho}$



## Some more plots



## Some more plots





# The next Steps

- Make more precise cuts
- Cut away the photons (middle peak)
- Make it run with MC files. (I already run on MC11  $ee \rightarrow ee$  with  $10^7$  events but only 24  $vpho$  survived the cuts)