B Measurement
using Partial reconstruction through e-h pair

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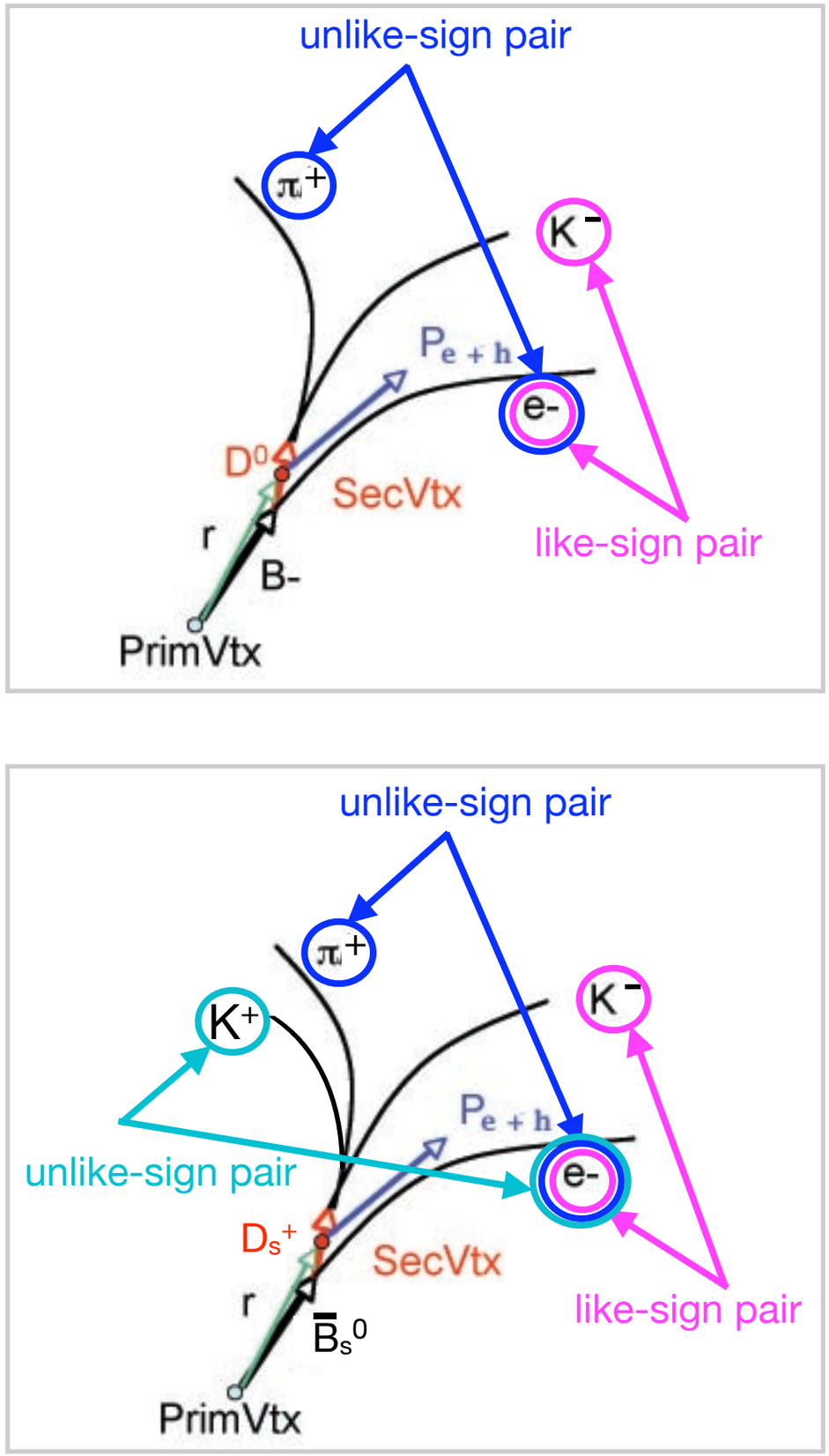
Beauty Analysis through e-h pair



- Idea: partial reconstruction of beauty decay through e-h(both of like sign and unlike sign pairs)
- Analysis procedure
  - select electron and hadron for pairing
    - electron selection : leading electron passing single track cuts and TRD quality cuts
    - hadron selection : hadrons passing single track cuts
  - make a pair and calculate pair characteristics
    - e-h invariant mass
    - e-h secondary vertex
    - e-h DCA to primary vertex
  - tag beauty electron based on pair characteristics

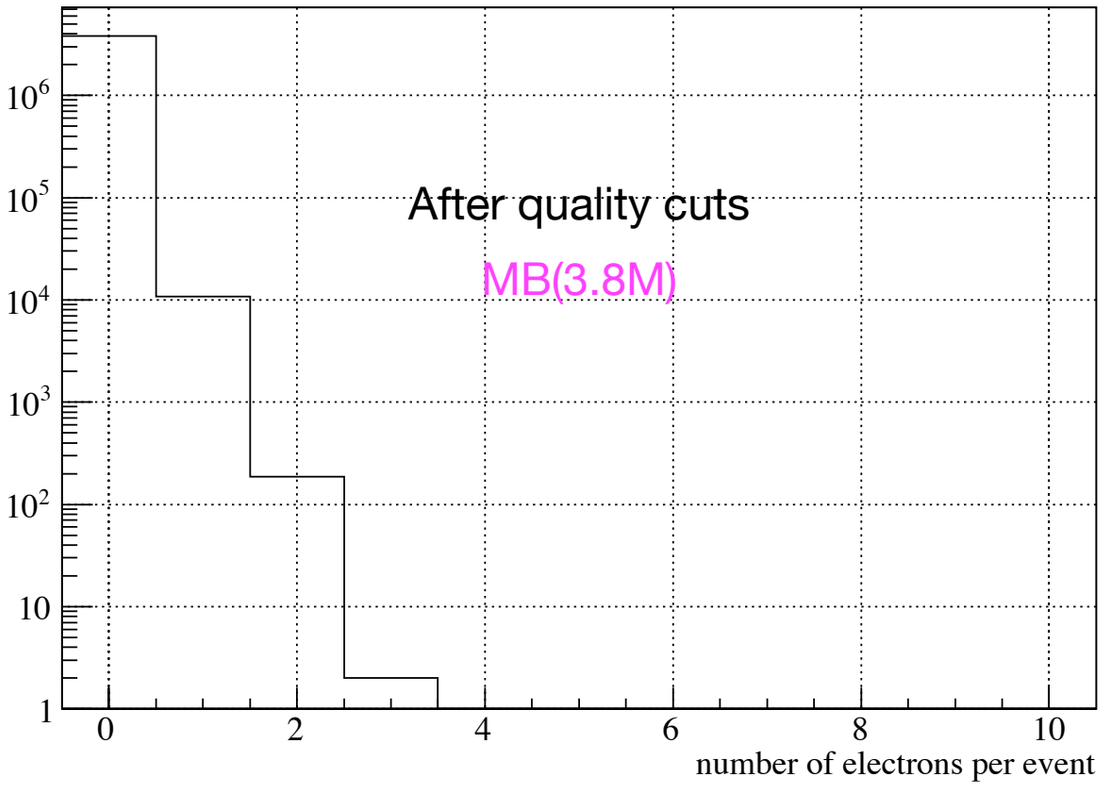
Question on Electron Selection

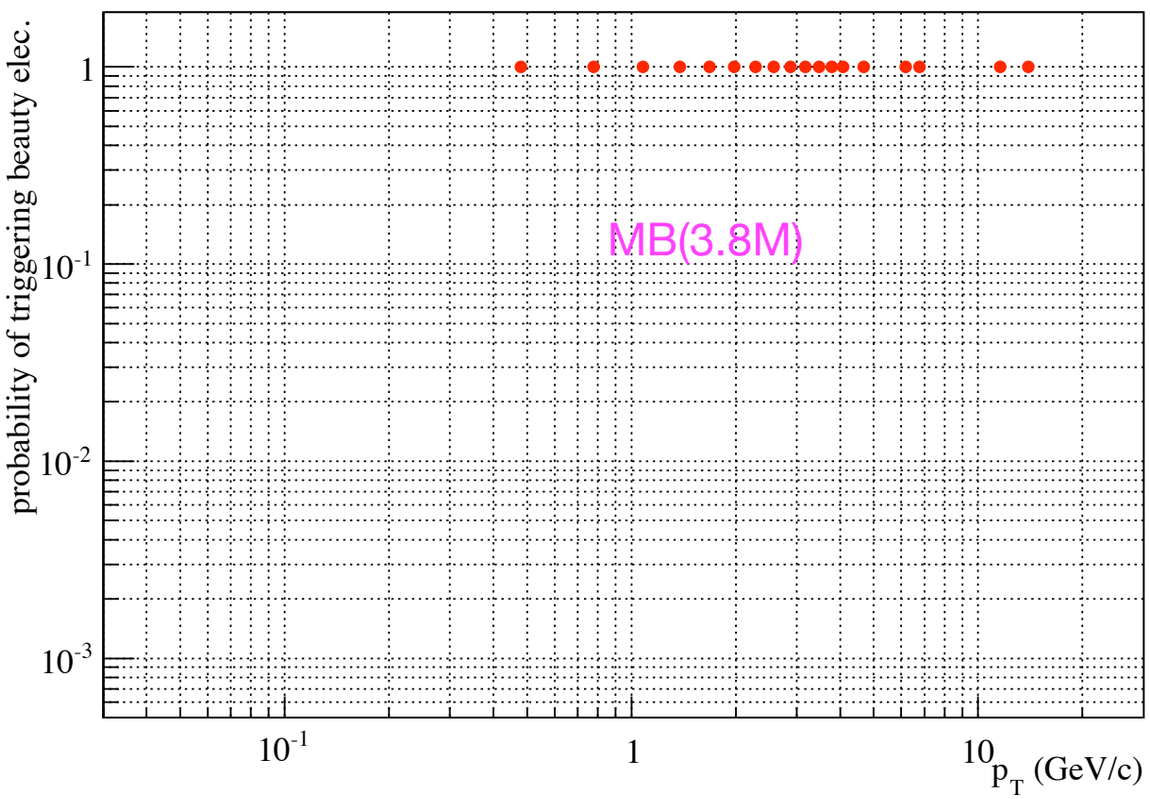
- Electron selection : trigger on leading electron (after electron quality cuts)

⇨ how much signal do we lose by selection only leading electron?

  - check

  ⇨ if the event contains beauty electron among all the other electrons, check probability that the leading electron to be beauty electron (to check signal loss by the method based on triggering leading electron)

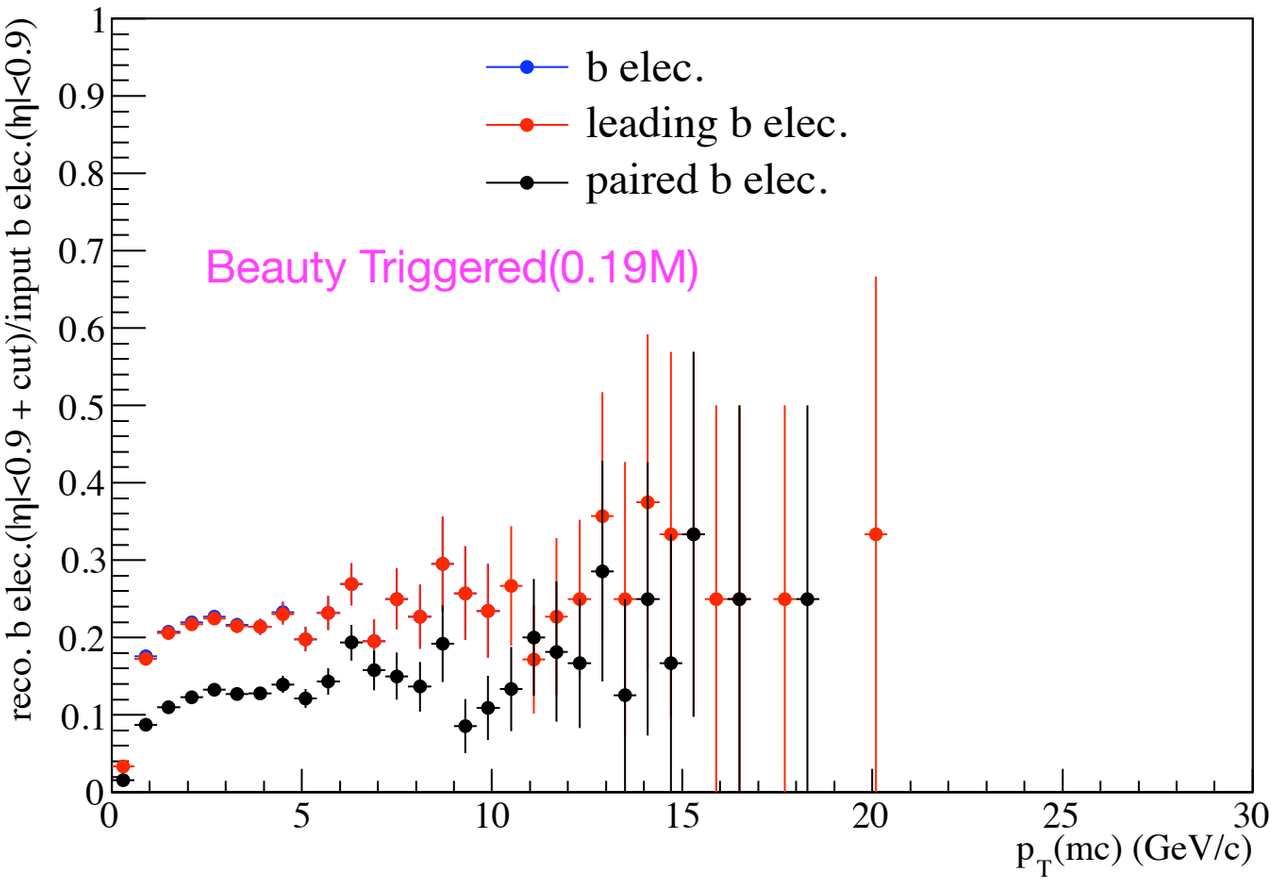




- beauty electron is being a leading electron in most of the case
- hadron contamination is not yet considered

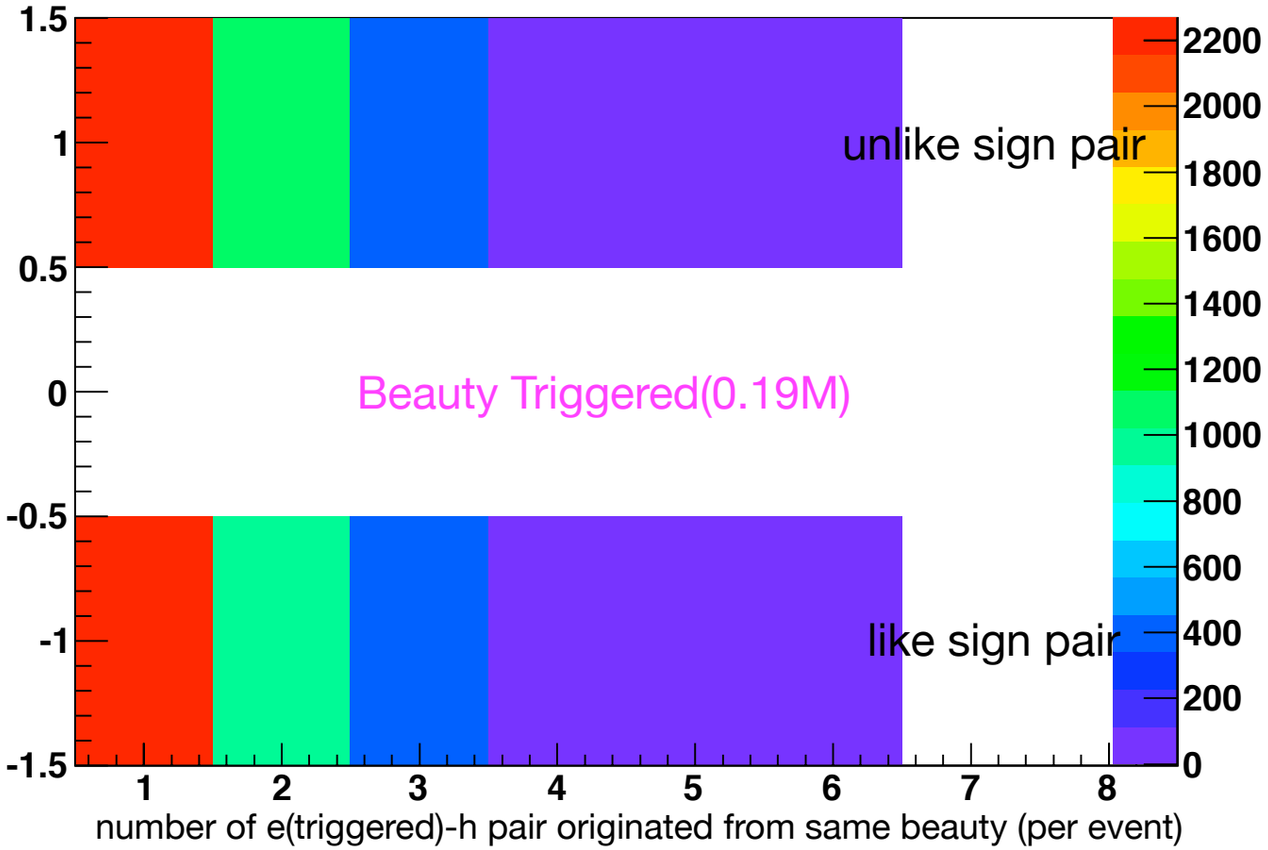
e-h(e) pairing [1]

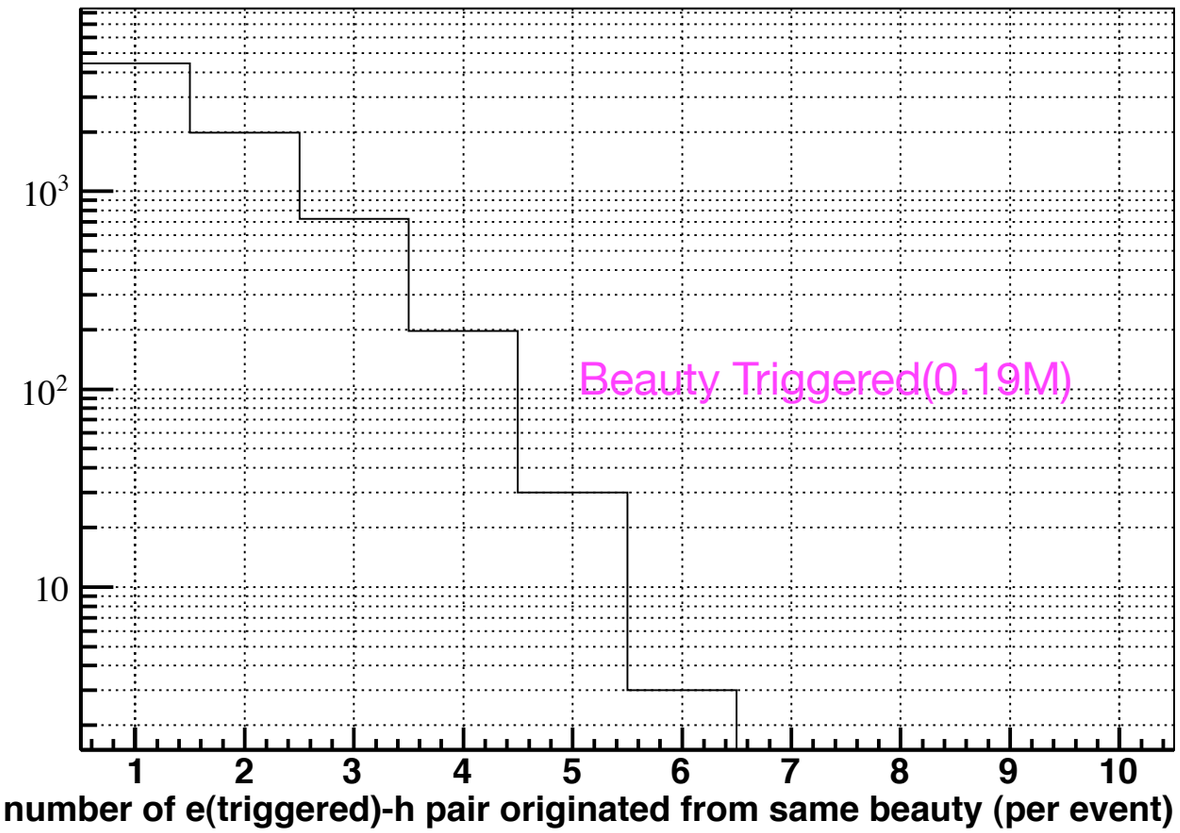
- After given hadron track cuts, make a pair with trigger electron and hadron



- At intermediate p_T, ~45% electrons doesn't find partner. have to check if this number is reasonable(I think it should less that this if we consider single track efficiency including acceptance).

e-h(e) pairing [2]

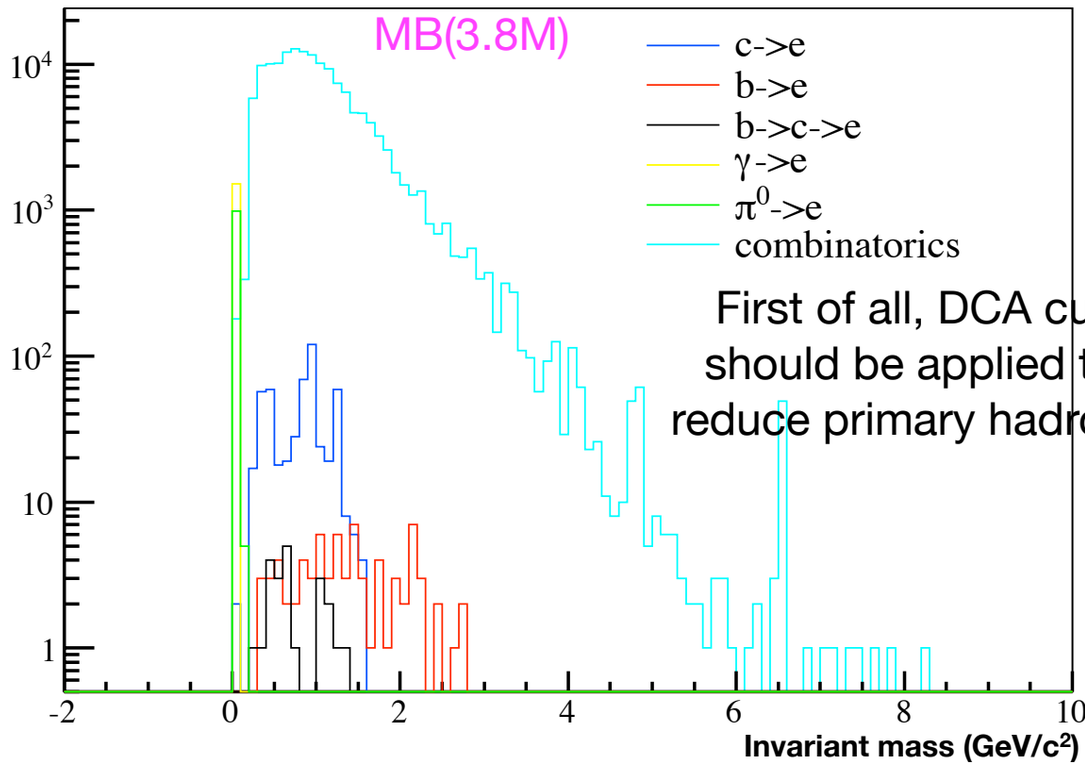


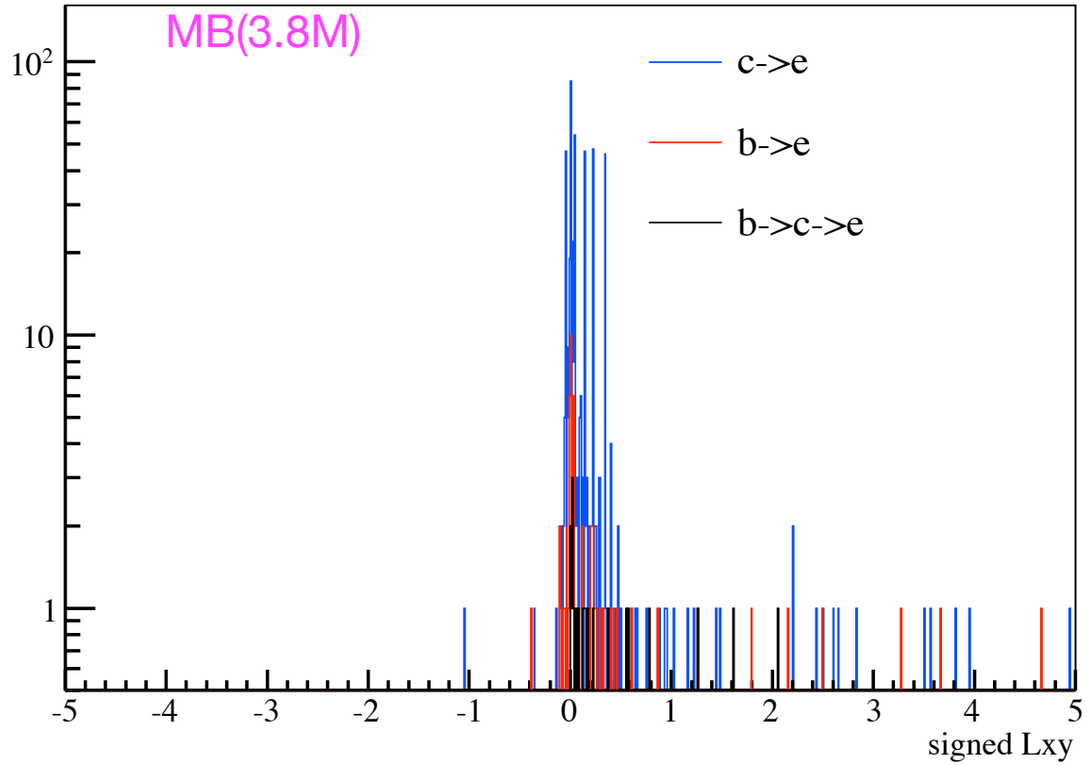


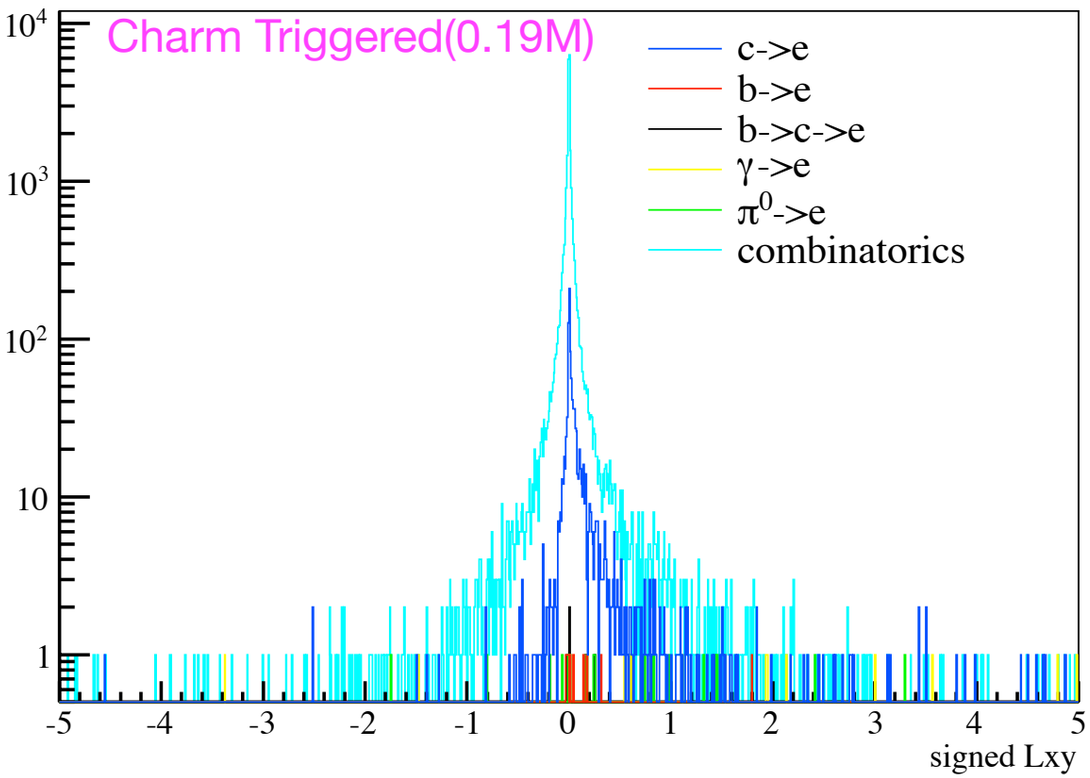
- Number of like sign and unlike sign pairs from beauty are similar
- ~50% of beauty has more than 3 ‘secondary vertex tracks’
  - Tag as a beauty electron if one of the pair passing “beauty pair requirement”?
  - Combine hadrons to improve secondary vertex quality?

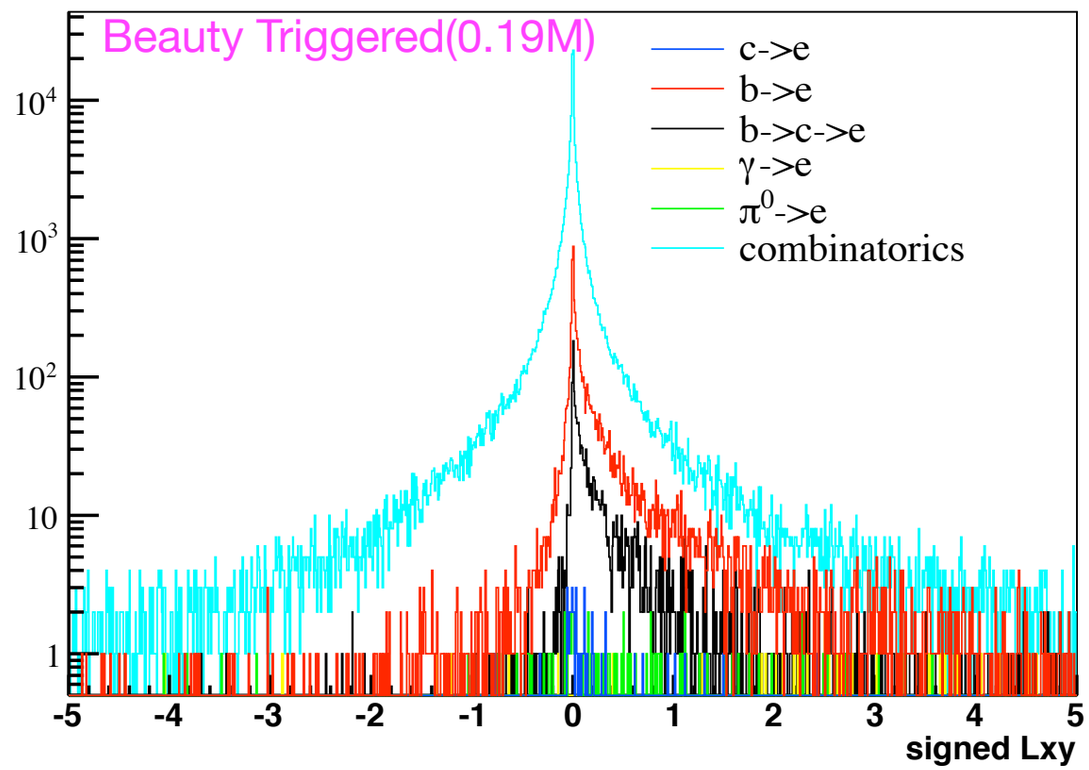
invariant mass and signed L_{xy} of e-h(e)

(double counting allowed)





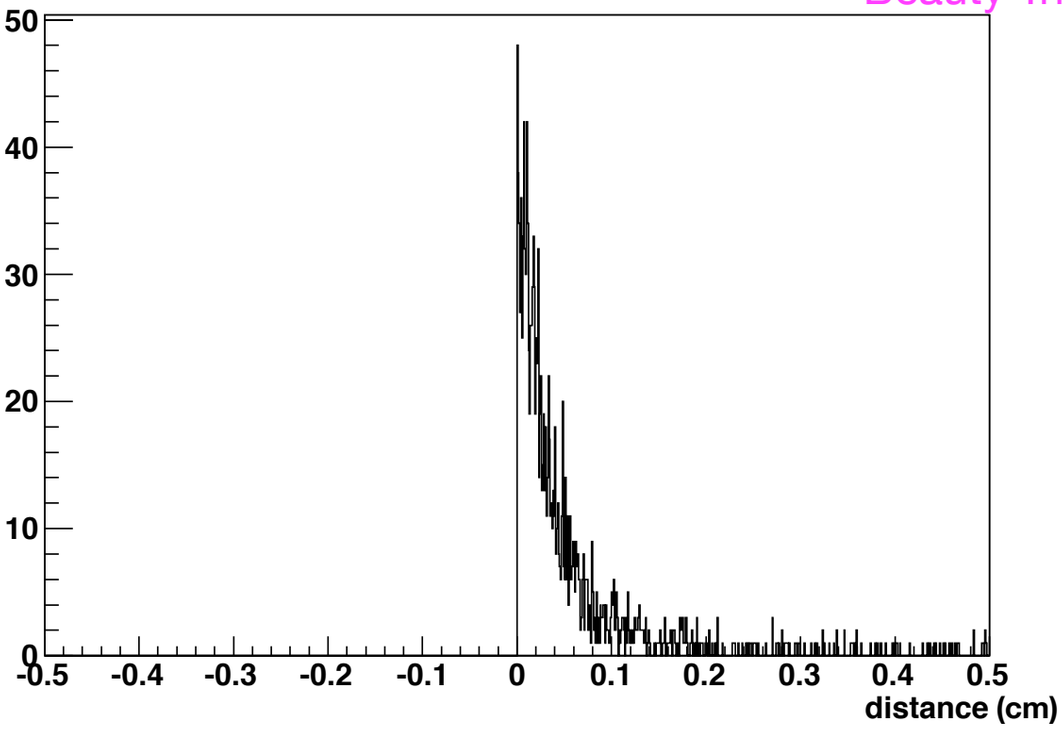


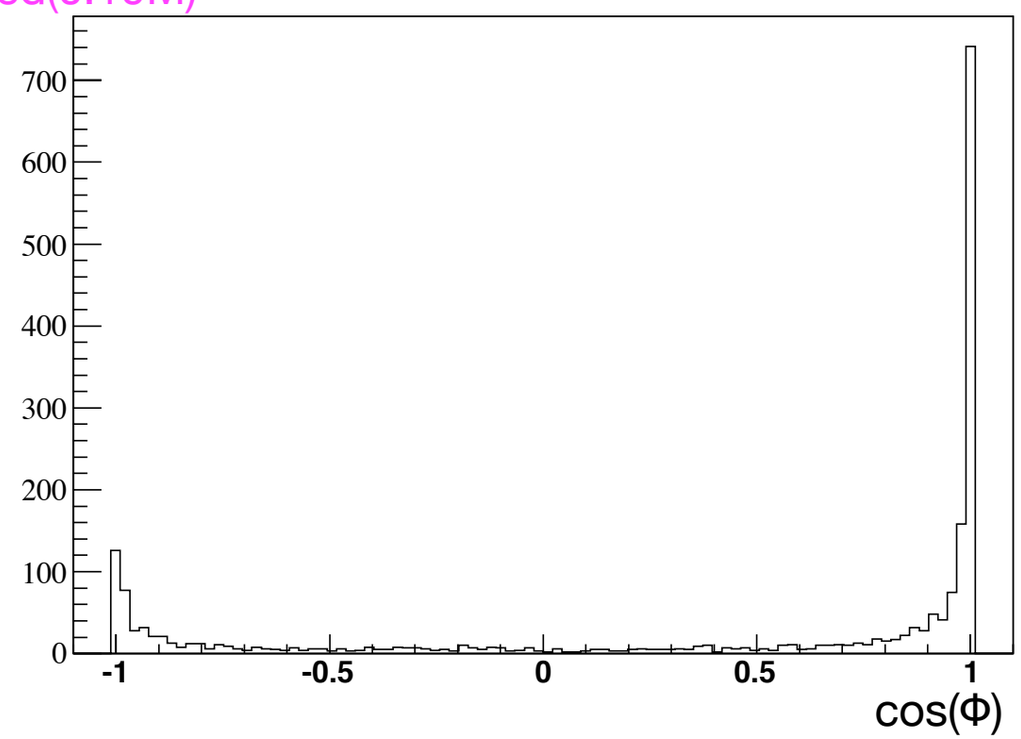


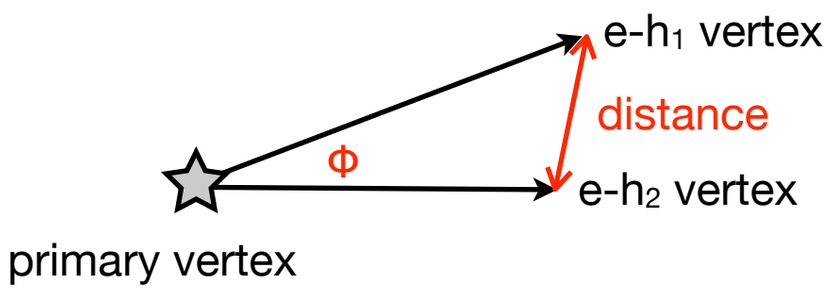
Possibility of Considering of Sec. Vertex based on 3 Tracks

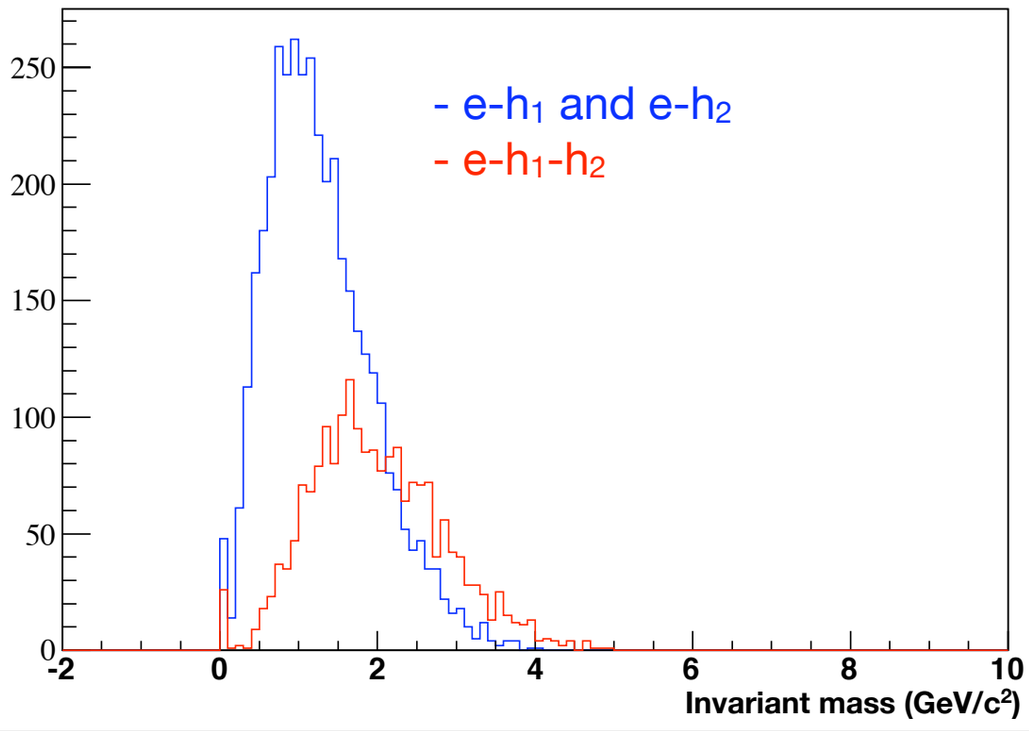
- Relation between two secondary vertices (e-h_1, e-h_2 from same beauty mother)

Beauty Triggered(0.19M)









- Looks promising with “only” signals but combinatoric is another issue

Summary

- no signal loss by selecting leading electron
- ~50% of beauty has more than 3 ‘secondary vertex tracks’, so necessity of 3 track secondary vertexing is question
- beauty shows distinctive power from charm but hugh combinatoric background is an issue. First, have to try on ‘powerful(?)’ single track cuts.

BACKUP

Cuts

- Single track cuts
  - pT > 0.2, |eta| < 0.9
  - Number of TPC clusters > 50
  - require ITS and TPC refit
  - require hit on the first pixels (good for rejecting conversion background)
  - reject kink daughter tracks
- TRD track cuts
  - TRDpidQuality >= 4
- Remark
  - In this analysis, DCA to primary vertex cut is not applied due to large efficiency loss especially for the high pT signal electrons. Should be investigated