B & B-Jet Analysis Strategy

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b-Jet Definition

- In this analysis, b-quark jet is defined to be a jet which contains at least one b-quark inside a cone of ‘certain’ size around the jet axis.

To do: Understanding of b-Jet Characteristics

- Starting with b decayed electron triggered samples

Questions are:

- Kinematics of b-Jet
  - b-Jet reconstruction using UA1 algorithm on MC(PYTHIA) and ESD track level, here tag jet as a b-Jet using MC truth of the particle(tag it as a b-Jet if B-hadron is inside the cone)
    - check b-Jet kinematics
    - check relation between B hadron and jet such as pT, angle from jet axis
    - check relation between “B hadron decay electron, B hadron decay charged hadrons” and jet such as pT, angle from jet axis
- Are leading particles coming from B decay products? what about electrons?

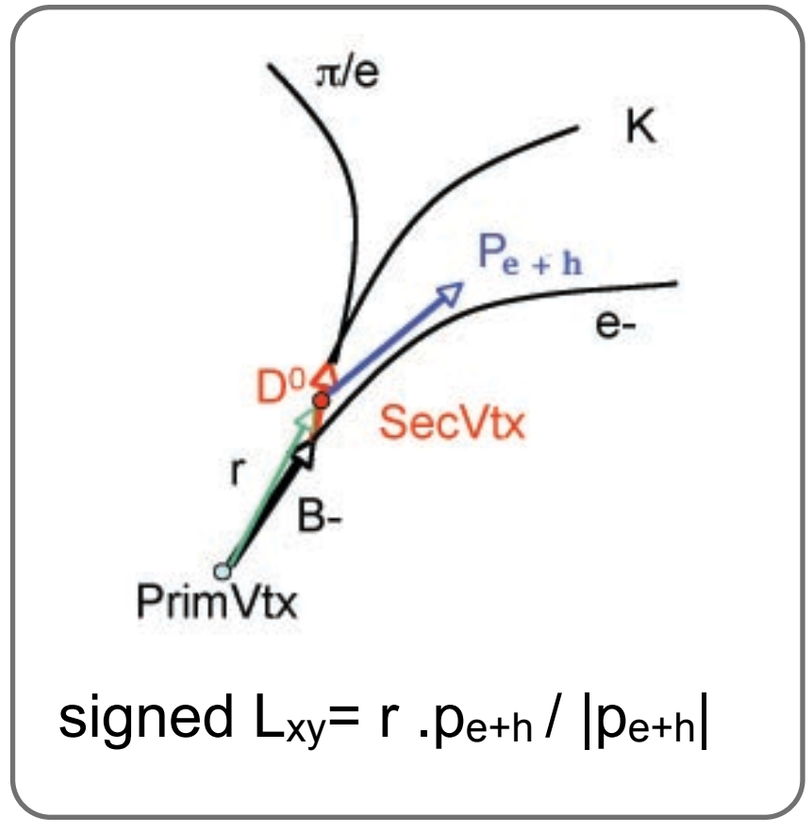
Remarks: what is already done.

- kinematics check of single b-quark, b-quark fragmented b-hadron and b-hadron decayed electron.

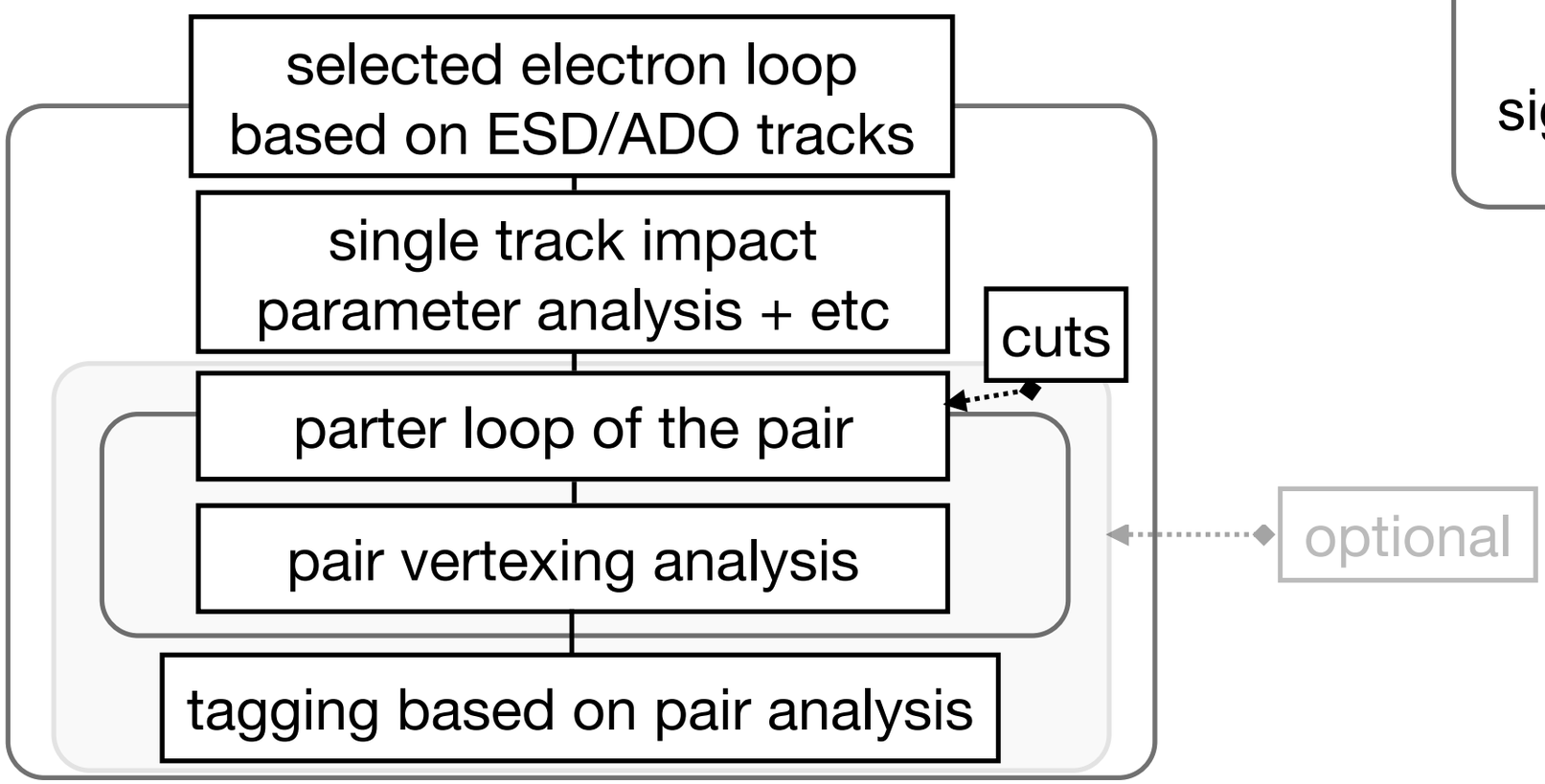
To do: Displaced Vertex Tagging(not associated to jet)

- find electrons (electron p_T cut? and other electron quality cuts)
- make pairs with other charged particles
  - parter selection cuts
- calculate “pair characteristics”, apply tagging cut
  - impact parameter of pair, L_{xy}
  - invariant mass
- then, make a tag for this electron track

algorithm(preliminarily developed by minjung but want to immigrate to common electron analysis framework)



signed L_{xy}= r .p_{e+h} / |p_{e+h}|



To do: b-Jet Tagging (association)

- b-Jets are tagged using a ‘certain’ tagging algorithm. In this analysis, we first want to try ‘displaced vertex tagging’ algorithm. This algorithm attempts to reconstruct displaced vertices from tracks which are within a ‘certain’ cone size around the jet axis. Displaced vertices reconstruction algorithm is being first developed in parallel without associating with jets(So this can be also used b itself tagging)

- Steps
  - tracks are associated with a jet if inside a fixed cone around the jet axis
  - jets are selected according to quality requirements(E_T, η and etc.)
  - displaced vertices analysis performed
  - jet is tagged as b-Jet if the output(L_{xy}, invariant mass) of displaced vertices analysis pass certain cut.
  - check tagging efficiency