# Questions to Draft 1.9 of ILD-2019-007 

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HF Working group meeting 27/4/20 Laboratoire de Physique
ee->bb at 500 GeV
Reconstruction efficiency for btagged events
ee->tt at 500 GeV
Polar angle spectrum of


- Clear drop towards acceptance limits - bbbar final state "Pencil like"

- Top quark covers larger angular surface as b
- Acceptance drop less well pronounced Laboratoire de Physique

1N2P3

- ee->bb a 500 GeV : Final selection efficiency

| $e_{L}^{-} e_{R}^{+} \rightarrow b \bar{b}$ at 500 GeV |  |  |
| :--- | :--- | :--- |
|  | IDR-L | IDR-S |
| $V t x+V t x$ | $12.9 \%$ | $12.8 \%$ |
| $K+K$ | $4.4 \%$ | $4.0 \%$ |
| $V t x+K$ (diff. jets) | $3.9 \%$ | $3.7 \%$ |
| $V t x+K$ (same jet) | $7.7 \%$ | $7.4 \%$ |

Table 2: Final selection efficiency, after double jet-charge measurement

- Kaons double the statistics (similar observation for ee->bb 250 GeV
- Need to make similar statistics for ee->tt which in the note is still very much Dominated by isolated lepton
- Need to understand better the influence of the Kaons in ee->tt
- e.g. Unsatisfactory results b-quark in $\mathrm{e}_{\mathrm{R}} \mathrm{e}_{\mathrm{L}}^{-}$
- More systematic studies in coming weeks by Yuichi
- We are hopefully heading towards the ILC
- Therefore choices for the detector(s) will have to be made
- Our analyses address a few key questions
- Layout of the vertex detector
- Closer to the beam pipe (May be an option at smaller energies, Z-pole, CEPC and FCCee study 12mm)
- Extension of acceptance of vertex detector
- Distance between end of vertex detector and first forward disk is realtively high in ILD
- Do we need a TPC?
- Leads to a sizeable increase of statistics do to particle ID of Kaons
- Are there other means of PID?
- TOF could work until 10 GeV in an optimistic scenario
- Might be enough at Z-pole (-> CEPC Study) but gets more involved at higher energies
- For heavy quarks we always have the vertex charge (with statistics penalty) but w/o particle ID we will close the door to lighter quarks
- Many of these question will addressed in this group and in particular in Yuichi's thesis


## Backup

