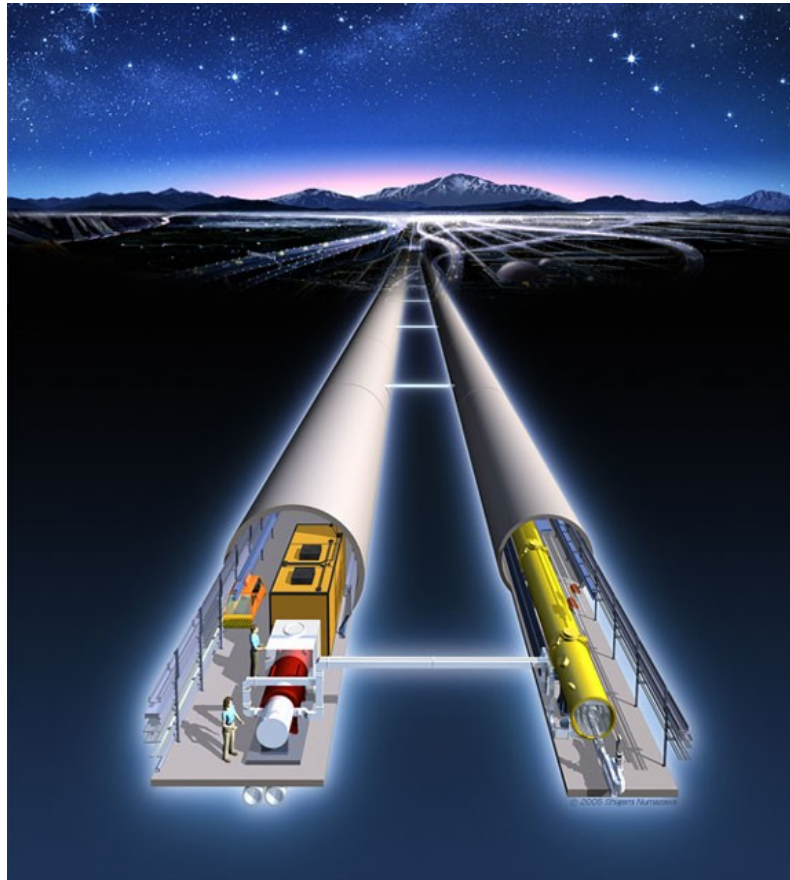


ee->tt fully hadronic (Very quick) review and outlook



Roman Pöschl

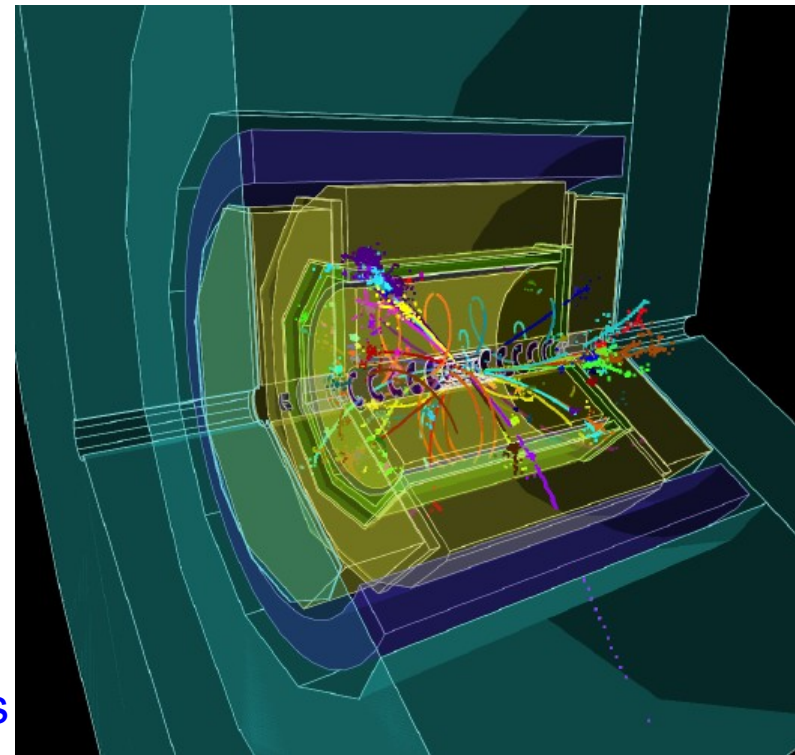
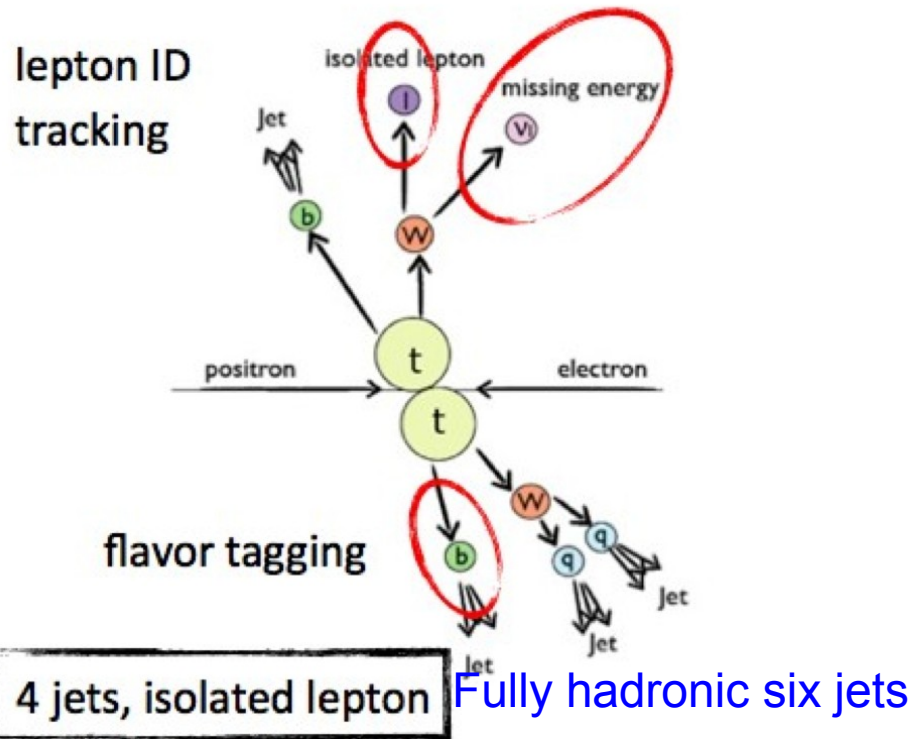


TYL/FJPPL day at LAL – February 2017

Three different final states:

- 1) Fully hadronic (46.2%) → 6 jets
- 2) Semi leptonic (43.5%) → 4 jets + 1 charged lepton and a neutrino
- 3) Fully leptonic (10.3%) → 2 jets + 4 leptons

$$t\bar{t} \rightarrow (bW)(bW) \rightarrow (bqq')(bl\nu) \quad \text{Fully hadronic } l\nu \rightarrow qq'$$



Final state reconstruction uses all detector aspects



- Fully hadronic was benchmark for DBD and subject of PhD thesis of Amjad
- In fully hadronic top decays b-quark charge is the only mean to get top direction
- First attempt by Amjad to measure b-quark charge revealed weaknesses of standard ILD reconstruction chain
- Detailed analysis of b-charge measurement by Sviatoslav for $ee \rightarrow bb$ and Semi-leptonic $ee \rightarrow tt$, first look at $ee \rightarrow$ fully hadronic
See talks at e.g. Santander workshop, ILD Meeting Lyon (and several ILD s/w ana meetings)
- Update of $ee \rightarrow tt$ fully hadronic analysis chain by Takaaki Yasui during summer internship (with guidance by Sviatoslav [and R.P.])
 - * Nice results, however minor disagreements with older analysis by Amjad on event selection (see report)

Very short term:

- Understand/reproduce differences in basic event selection between Takaaki and Amjad
- Apply VertexCharge Recovery with all necessary cuts
- => Best knowledge result on $ee \rightarrow tt$

- Understand residual short-comings in reconstruction

Short and Medium term:

Most likely even after application of best knowledge there will be residual migrations for the eRpL initial state (wrong combination of b-quark and (leading))

=> Check c-quark tagging (Remember 50% of W decay to cs)

- Follow up production of samples of updated ILD Detector Models (small and large)

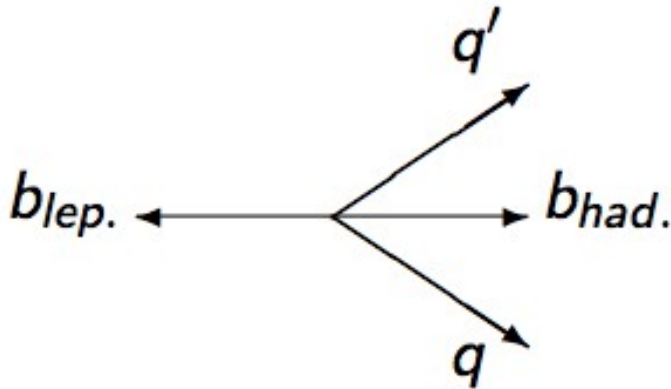
- Need also manpower to follow-up $ee \rightarrow bb$

Proposal:

- Takaaki completes his analysis with all necessary cuts
- UCL (and Adrian at LAL) bring to run the updated analysis chain and catch up with Takaaki
- Sviatoslav acts as consultant while completing the $ee \rightarrow bb$ paper

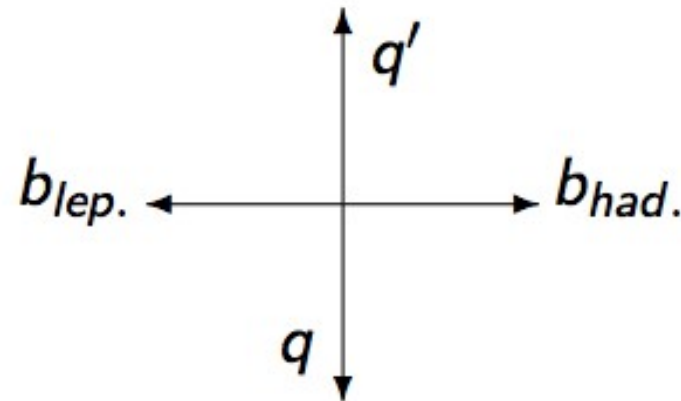
Backup

- To measure A_{FB} in fully hadronic decays there is no choice
- In semi-leptonic decays there is the charged lepton but



Right handed electron beam:

- mainly right handed tops
- In final state (V-A)
- Hard W in flight direction of Top and soft b's
- Flight direction of t from flight direction of W



Left handed electron beam:

- mainly left handed tops
- Hard b in flight direction of Top and soft W's
- Flight direction of t from flight direction of b
- => Wrong association ↔ top flip

Measurement of b-charge to resolve ambiguities