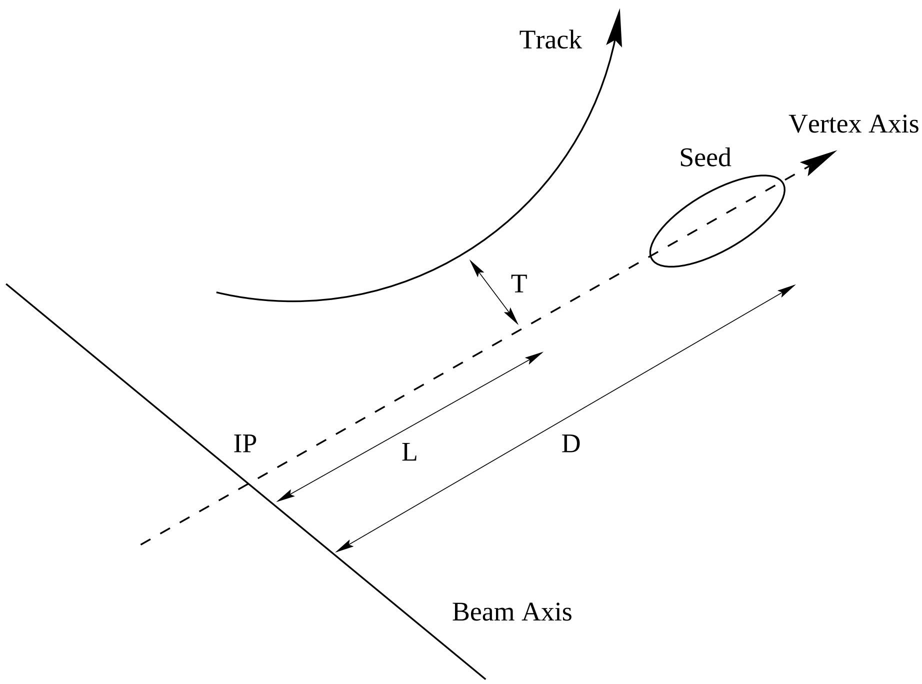
SLD Flavor-Tag

- Find seed vertices with ZVTOP
- NN selection of "good" seeds
- NN attachment of remaining tracks to "good" seeds

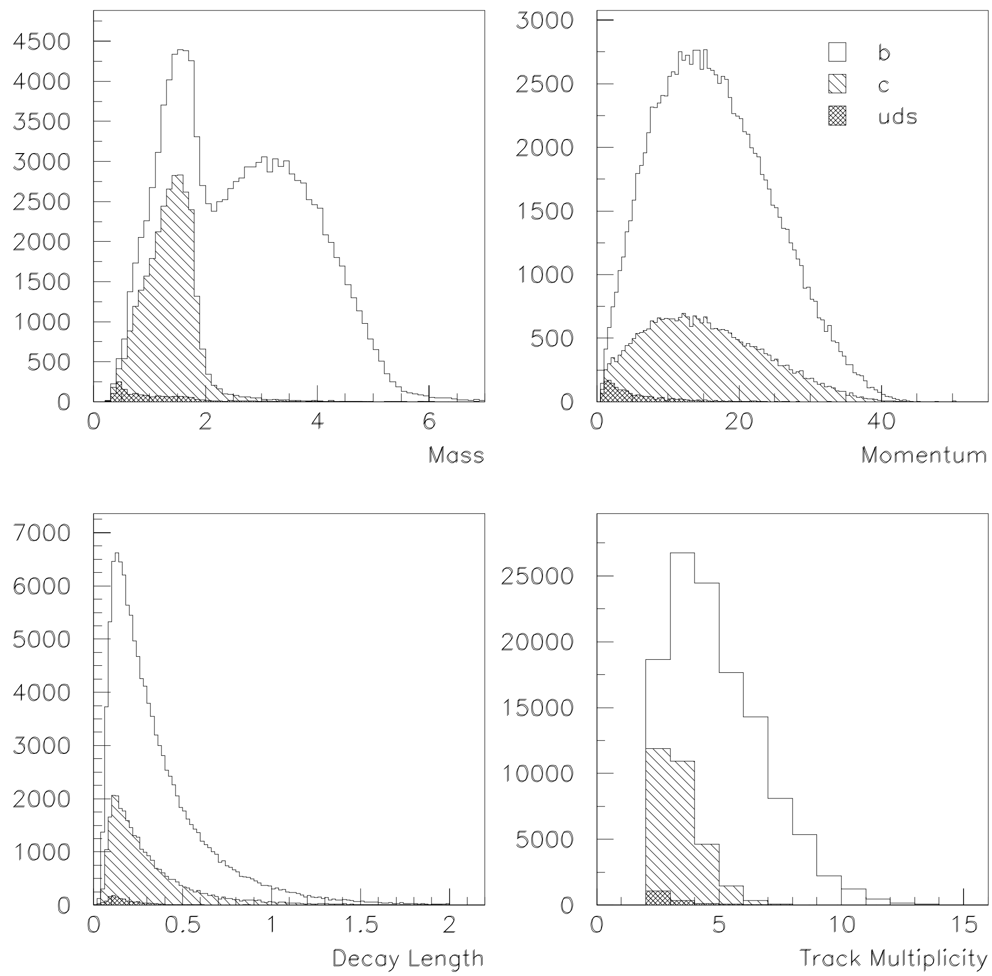


For selected tracks, calculate:

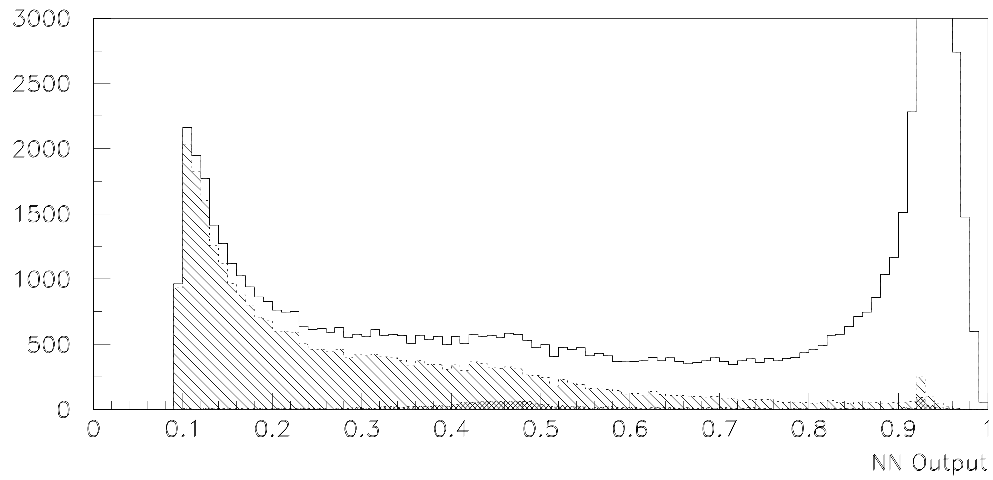
- Invariant mass, corrected for missing p_T
- Charged momentum
- Decay length of fitted vertex from IP
- Charged multiplicity

These are fed into a final NN for charm/bottom separation

NN inputs:



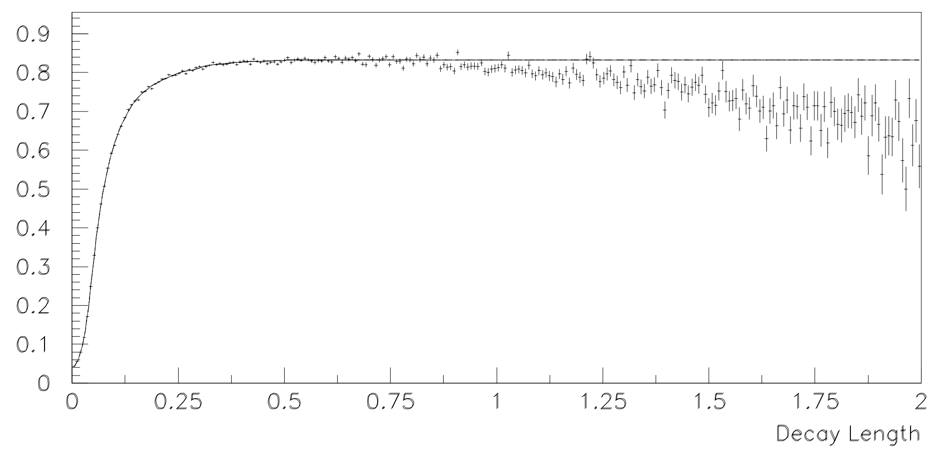
NN output:



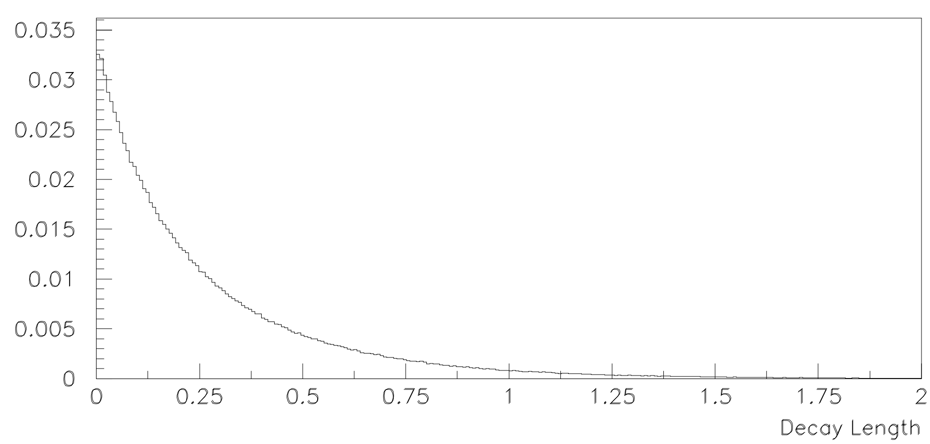
Projection to LCD

Extrapolate SLD efficiencies to detector with better position resolution.

Start with tag efficiency vs. B, D decay length:



and decay length distribution:

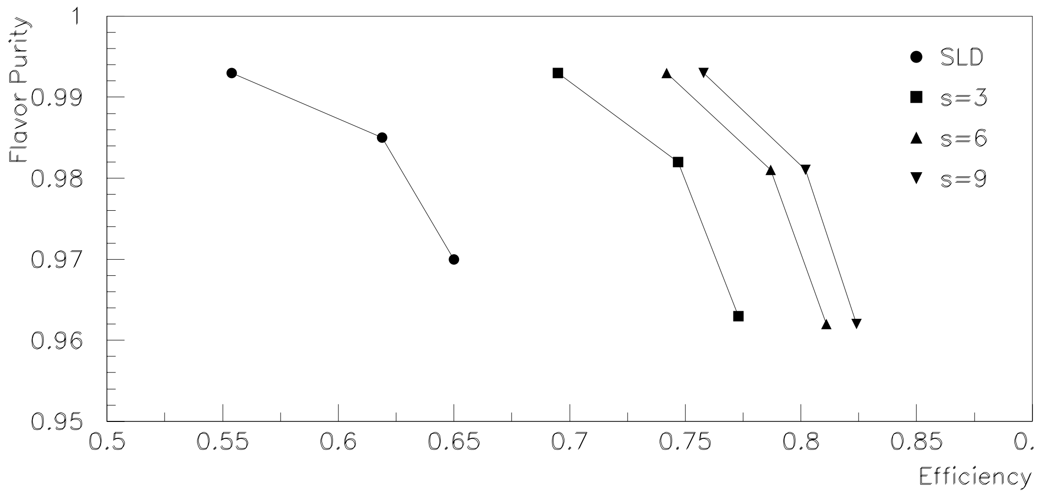


Then for a factor s better resolution:

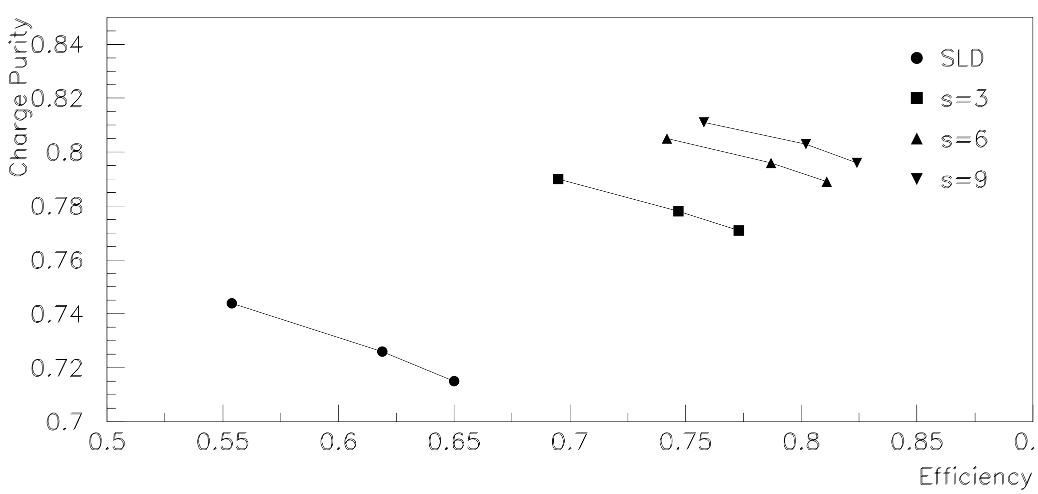
$$\epsilon_{new} = \int N(l)\epsilon(sl)dl$$

Results: b-tag

Calculate ϵ_{new} for various values of s and NN_{out} cuts, both for b signal and c background. These purities don't include uds contamination.

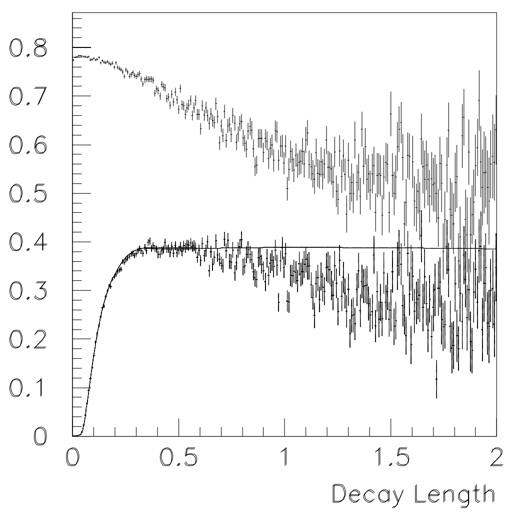


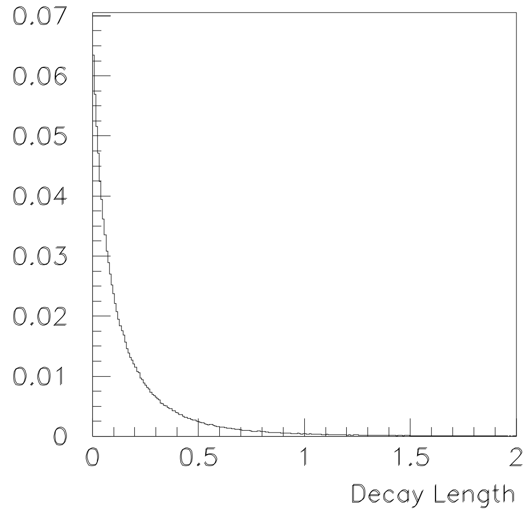
Can also calculate the efficiency to tag a B with a particular vertex charge. The "charge purity" is the fraction of tagged jets where the vertex charge equals the charge of the underlying B-hadron.



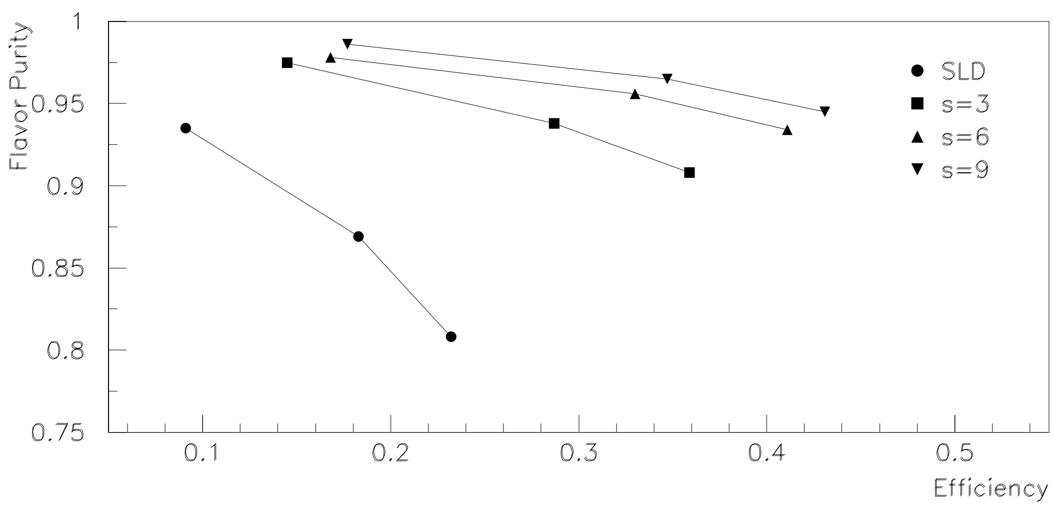
Results: c-tag

Can get bigger improvements here. D^0 decays have a higher $N_{chg} \geq 2$ fraction than $D^{\pm}$ ones, so we see a higher fraction of vertex-able decays (top curve) as we look closer to the IP.





Since N_{chg} is generally small, improvements in tracking efficiency would probably help here as well.



The efficiency just to find a vertex (no c/b separation) plateaus at $\sim$0.5.