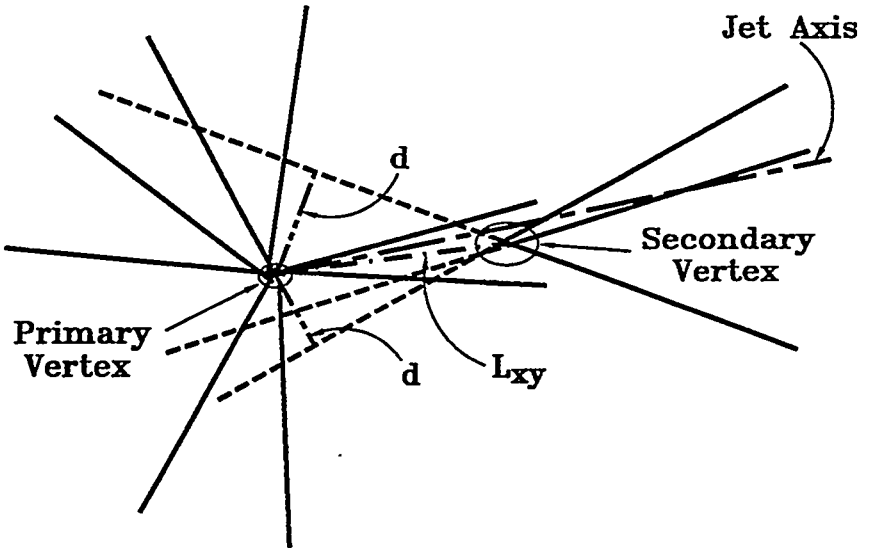

Figure 9: A schematic of the decay of a bottom quark, showing the primary and secondary vertices, and the charged tracks reconstructed in the CDF CTC and SVX detectors.

and comparing these with observed rates in other channels.

The mistag probability has been measured using both samples of inclusive jets and the inclusive electron and dimuon samples. The probability of mistagging, as a function of the number of jets in the event and the transverse energy of the jet is shown in Fig. 10, based on the inclusive jet measurements where we have plotted both the negative and positive tag rates. The negative tag rate is perhaps the best estimate of the mistag rate, since we expect some number of real heavy quark decays in this sample to enhance the positive tag rate. The mistag rate per jet measured in this way is ~ 0.008, and is lower than the positive tag rate measured in the inclusive jet sample (~ 0.025), as expected from estimates of heavy quark production in the inclusive jet sample.

To account for all sources of background tags, the number of tagged events expected from sources of real heavy quark decays (primarily $Wb\bar{b}$ and $Wc\bar{c}$ final states) is determined using a Monte Carlo calculation and a full simulation of the detector. The sum of this "physics" tag rate and the mistag rate then gives us an estimate of the total background to $t\bar{t}$ production. This estimate can be checked by using the positive tag rate in inclusive jet events as a measure of the total non-$t\bar{t}$ tag rate in the $W+$ jet events. This gives us a somewhat higher background rate, due primarily to the expected larger fraction of b and c quarks in the inclusive jet sample compared to the $W+$ jet events.

The efficiency for finding at least one jet with an SVX tag in a $t\bar{t}$ signal event is calculated using the ISAJET Monte Carlo programme [22] to generate a $t\bar{t}$ event, and then applying the measured tagging efficiencies as a function of jet E_T to the reconstructed b quark jets. The SVX tagging efficiency, *i.e.* the fraction of $t\bar{t}$ events with at least one SVX-tagged jet, is found to be 0.42 ± 0.05, making this technique