Drift Chamber Efficiency

The drift chamber efficiency was computed for three cases corresponding to the following cuts on the χ^2 distribution: 5, 50, and 200. The attached plot shows the resulting efficiency for each DC plane. All planes have efficiencies better than 0.9999, except for plane 17, which was dead in this run, and plane 21 which has 2 dead wires. The variation of efficiencies between the different χ^2 cuts is within statistics.

In this analysis 84% of the events (triggers) pass the event "cleaning" filters. Of these events, 24% pass the tracking cuts when requiring a χ^2 better than 5; 57% when requiring a χ^2 better than 50; and 72% when requiring a χ^2 better than 200.

In all these cases 7% of the tracks fail due to insufficient plane-hits (at least 3 U planes and 3 V planes are required to have hits for the tracking to proceed); and 0.25% fail in the kalman filter. The reamaining events fail as a result of the cut on the χ^2 distribution.

It is worth noting that in the DC **intrinsic** efficiency calculation no cuts are imposed on the individual hits. This means that hits from noise and cross talk are used in the track fit. This results in a bad χ^2 for many tracks, which requires relaxing the χ^2 cut for such analysis (otherwise a good fraction of the tracks will be lost). As a result, this calculation does not provide a good determination of the tracking efficiency.

Another point worth emphasizing is the difference between the DC intrinsic efficiency and the actual efficiency that we will get after imposing various cuts on the individual hits. The latter will obviously be lower, but it is a harder number to obtain at this point since it depends on how well we can identify the outliers from the real hits using the various mechanisms available. For example, while a cut on the TDC width is an easy way to eliminate cross talk hits, it will also cut some of the good hits. Instead of cutting such hits, one can tag them, and then test them in the tracking code to determine if they are indeed outliers. This will obviouslly result in a higher efficiency than if these hits are eliminated.

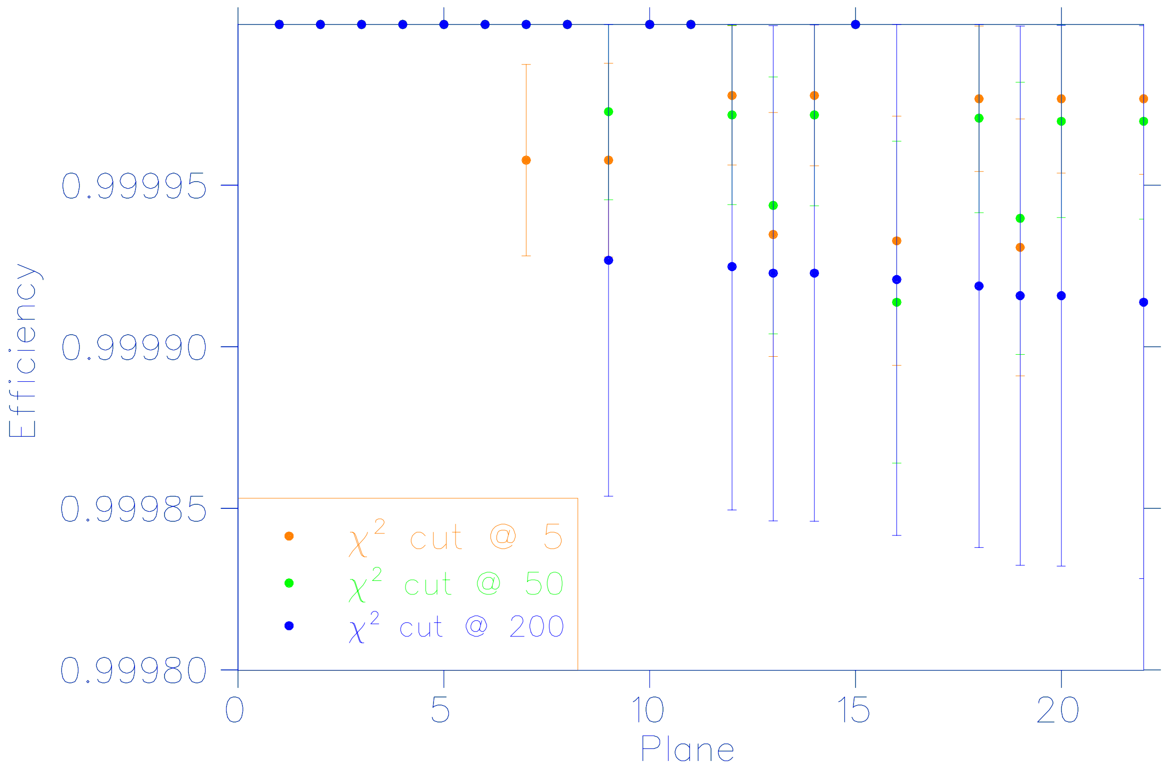

Figure 1: Plane efficiencies calculated using a χ^2 cut at 5, 50, and 200.