Plane Rotations

This is another quick note showing some preliminary results on plane rotations. The average residuals were computed in five equal bins along the length of the wires for each plane (each bin spans a length of 7 cm, the longest wire(s) are 35 cm). If an overall plane rotation was present, the bins closest to the end of the wire would show a maximum "shift" in the average residuals.

The average residuals in these 5 bins were then used to compute an "average" rotation angle for each plane. Figure 1 shows this angle for DC planes 1-22 (half stack). All these rotational misalignments are within our current resolution, and are therefore consistent with zero. The maximum angle (of $\sim 1.5 \times 10^{-03} degrees$) corresponds to a shift of $\sim 5\mu m$ at the end of the longest wires. The error bars on this plot were computed assuming an error of $\sim 5\mu m$ at the end of the longest wires, since this is the estimated accuracy of this calculation (at least for now).To verify this result I looked at the residuals histograms in all five length-bins for all planes. The means on these residuals histograms were few microns away from zero (at most) independent of bin number.

These results are somewhat surprising considering that the planes had shifts of up to $300\mu m$ in the transverse direction. The obvious question is whether the mechanical construction of the chambers restricts rotational misalignments. Since these rotational misalignments are small and consistent with zero, no rotational corrections were implemented, and no iterations were performed.

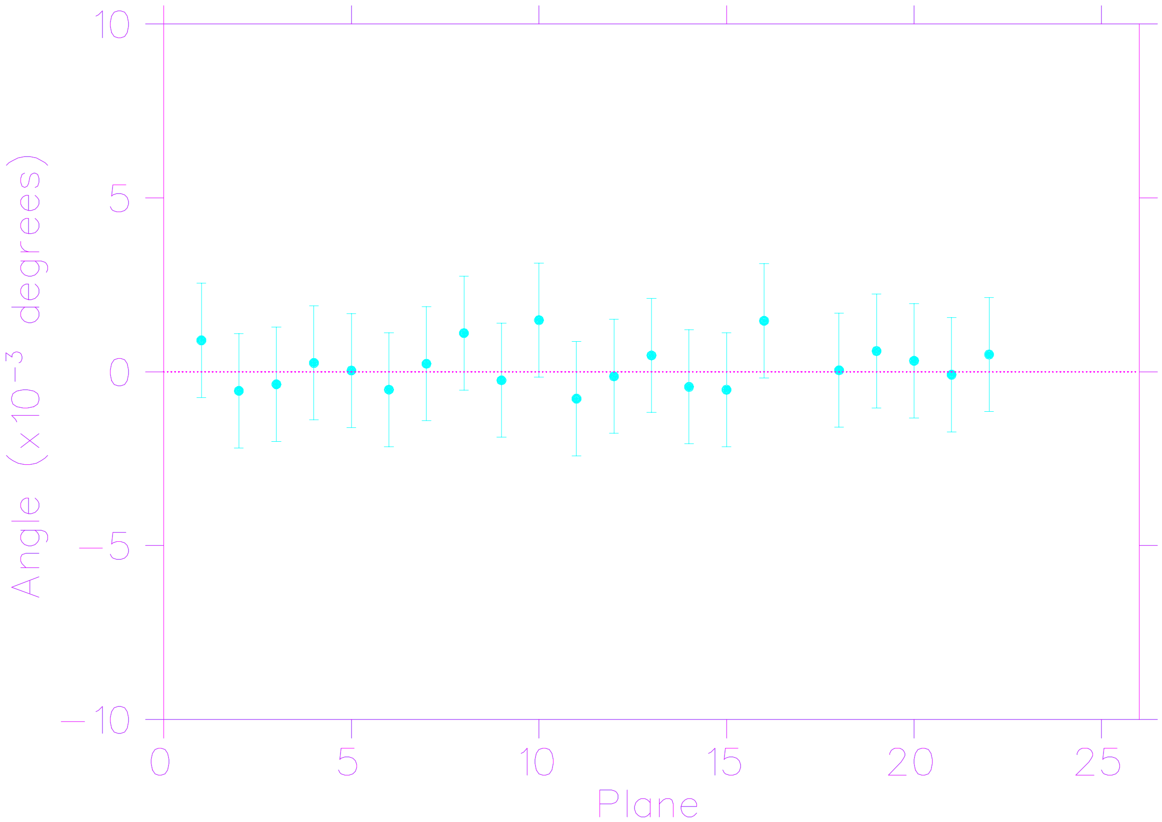

Figure 1: Plane rotational misalignments as determined from run 1790.