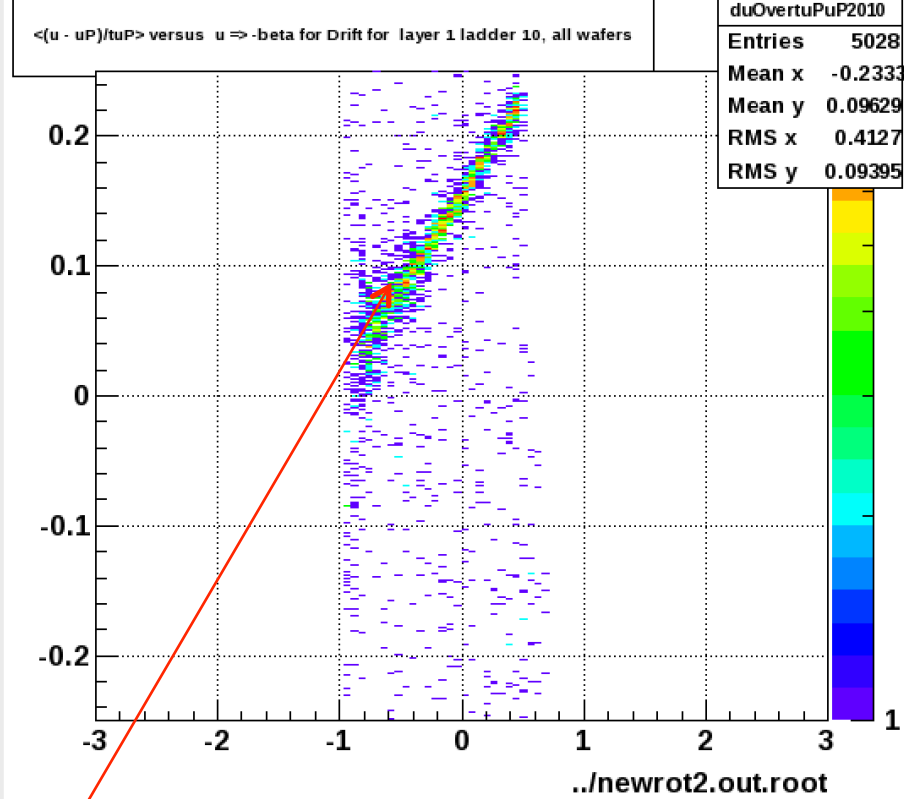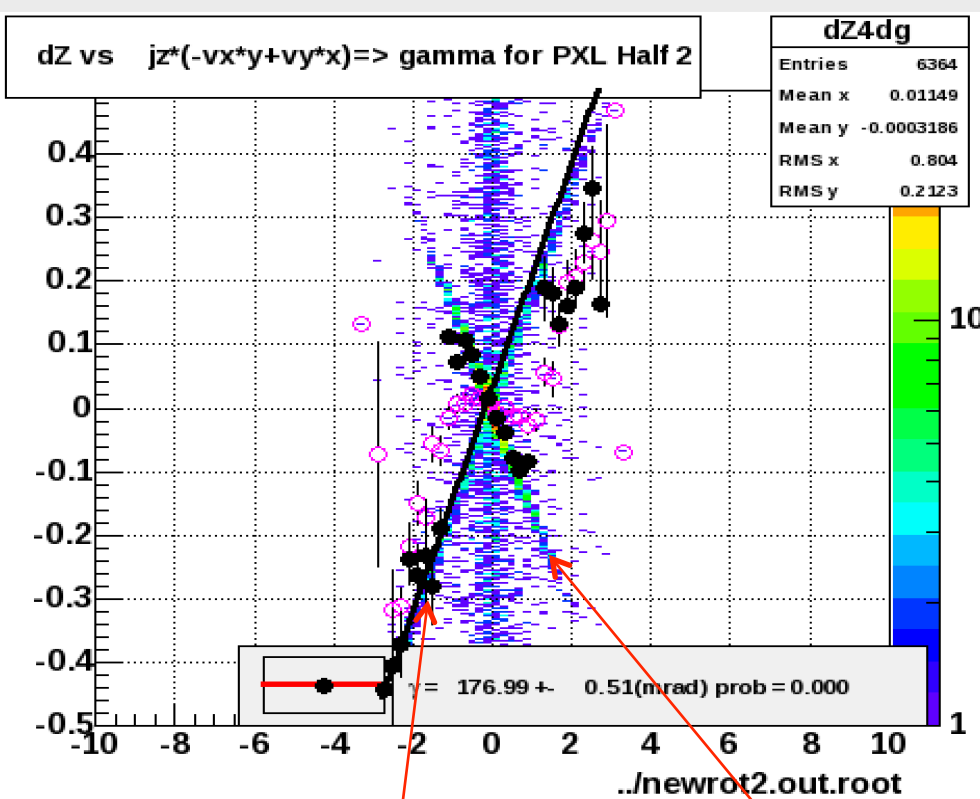# Alignment Update

- Alignment testing with simulated rotations around the three axes is progressing well with the students well engaged (Long, Mike)

- Plotting programs now can do Ladder histos in local coordinates

- The inner ladder in PXL (layer 1) shows an inversion or results since it is inverted (see next slides). I need the full picture before I correct this at the variable level

- One important lesson from the exercise so far is that not all histograms of the same quantity have the same resolving power. One needs to carefully select the 'right' ones.

- Another lesson is that one needs to look at both Global and Local variables to get the correct picture since, e.g. rotations introduce apparent local translations

- Global variables are in STAR system and Local in Karimaki (see last slide)
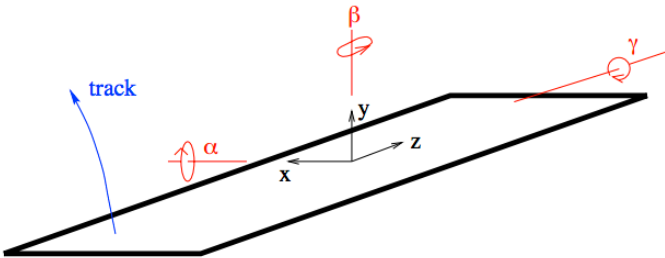
dZ vs jz*(-vx*y+vy*x)=> gamma for PXL Half 2

dZ4dg	
Entries	6364
Mean x	0.01149
Mean y	-0.0003186
RMS x	0.804
RMS y	0.2123

γ = 176.99 +- 0.51(mrad) prob = 0.000

../newrot2.out.root

<(u - uP)/tuP> versus u => -beta for Drift for layer 1 ladder 10, all wafers

duOvertuPuP2010	
Entries	5028
Mean x	-0.2333
Mean y	0.09629
RMS x	0.4127
RMS y	0.09395

../newrot2.out.root

Global –Local histogram
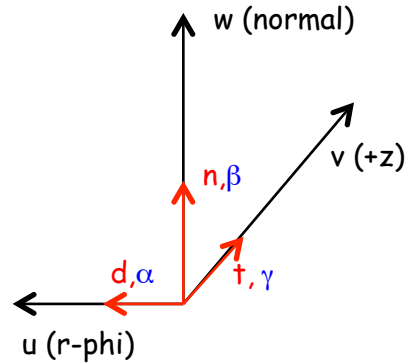of same inner ladder-10

Global histogram
of outer ladders

- By mistake this was a 10 degree rotation!!!
- Local inner has the correct sign but
- inner/outer ladders show opposite sign in both local/global
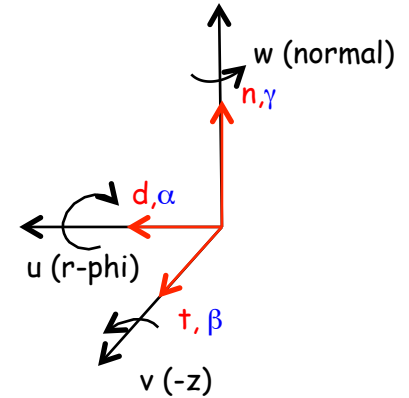
2

Wafer Local Coordinates Details

D. Chakraborty, J. D. Hobbs

Gene Van Buren et al.

Karimaki -CMS

$$x = x_d = u \quad \Rightarrow \quad \delta x = \delta x_d = \delta_u$$

$$y = x_n = w \quad \Rightarrow \quad \delta y = \delta x_n = \delta_w$$

$$z = x_t = -v \quad \Rightarrow \quad \delta z = \delta x_t = \delta_v$$

$$a = \phi_d = a \quad \Rightarrow \quad \sin a = \delta\phi_d = \delta_a$$

$$\beta = \phi_n = \gamma \quad \Rightarrow \quad \sin\beta = \delta\phi_n = \delta_\gamma$$

$$\gamma = \phi_t = -\beta \quad \Rightarrow \quad \sin\gamma = \delta\phi_t = -\delta_\beta$$