CEPCSW ------ VXT _Barrel section
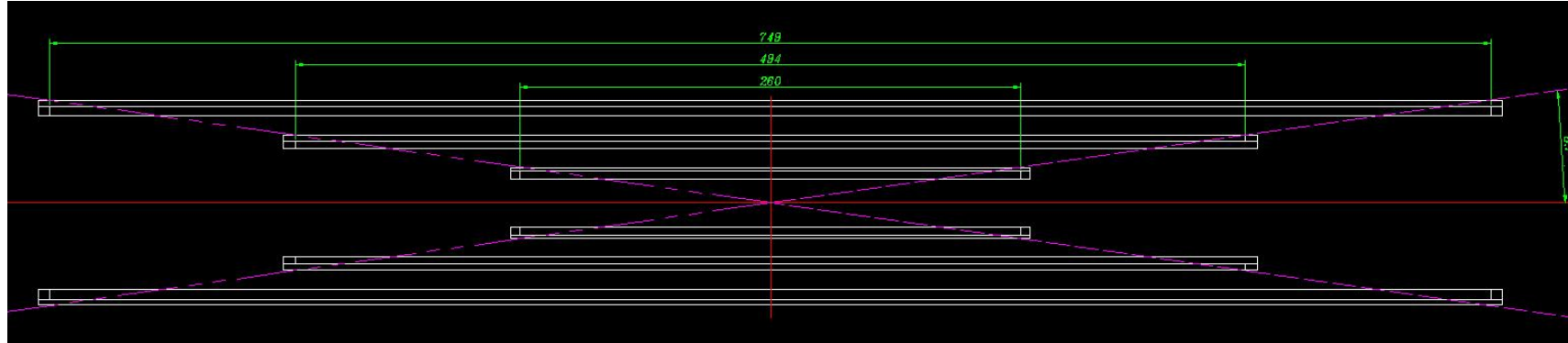
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VTX-Two structures

> Input the following two structures in CEPCSW without changing the radius, the ladder number of each layer, etc.
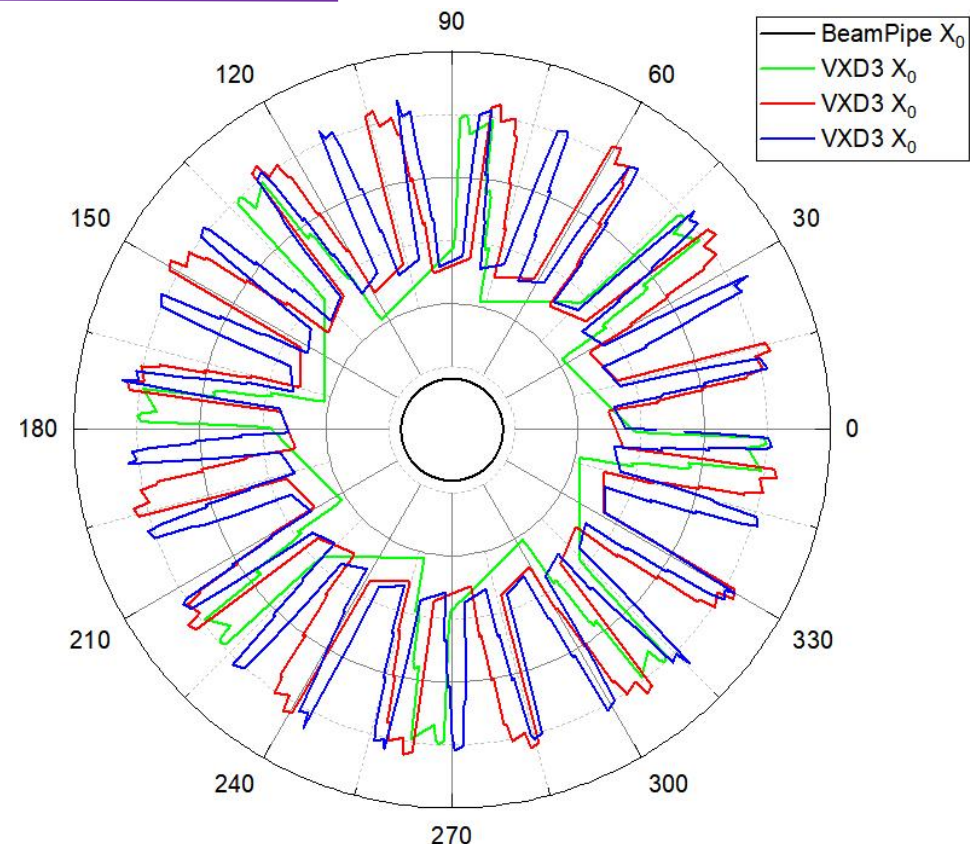

|	layerX	size .mm ($W \times H \times L$ mm)	the number of Al layer	support thickness .mm
Short Barrel	layer1	17.4×1.7×260	4×2	0.167×2
	layer2	17.4×1.7×260	4×2	0.167×2
	layer3	17.4×1.7×260	4×2	0.167×2
Long Barrel	layer1	17.4×1.7×260	4×2	0.167×2
	layer2	17.4×2.5×494	6×2	0.179×2
	layer3	17.4×3.2×749	6×2	0.185×2

VTX-Material Budget
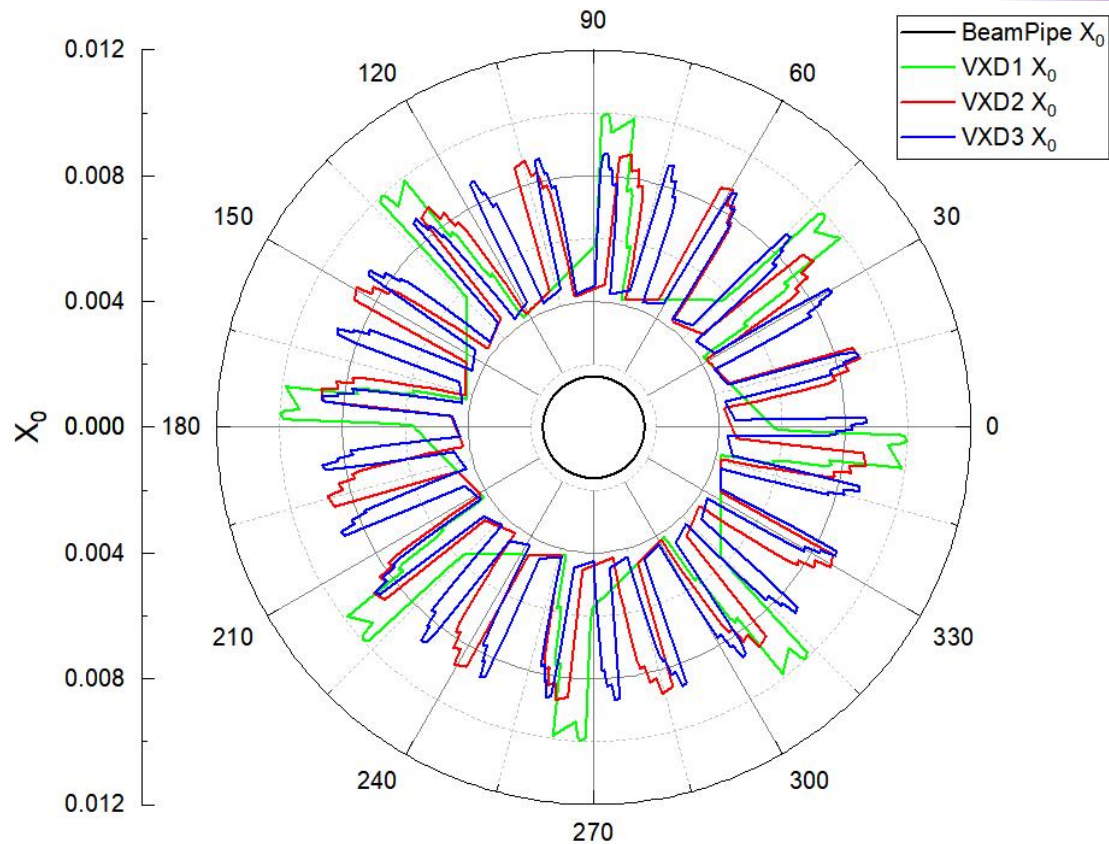
The material budget X_0 of the short barrel structure varies with φ when $\theta = -90°$.

The material budget X_0 of the long barrel structure varies with φ when $\theta = -90°$.

➢ When particles are vertically incident on VXD1 and VXD2, the material budget of each layer(double-layer) is $0.00374X_0$, $0.00429X_0$.

➢ Due to the rotation arrangement and the presence of overlap, X_0 is not uniformly distributed in the $\varphi - direction$;

VTX-Material Budget
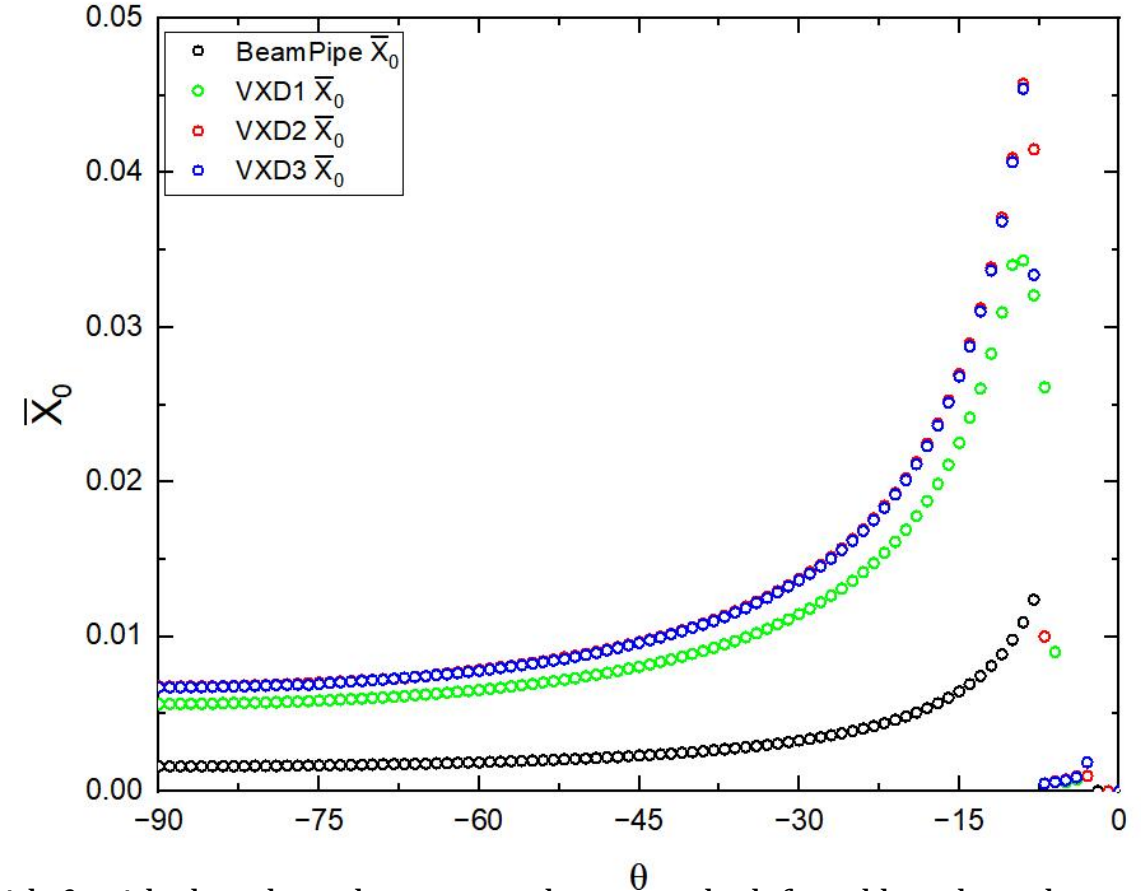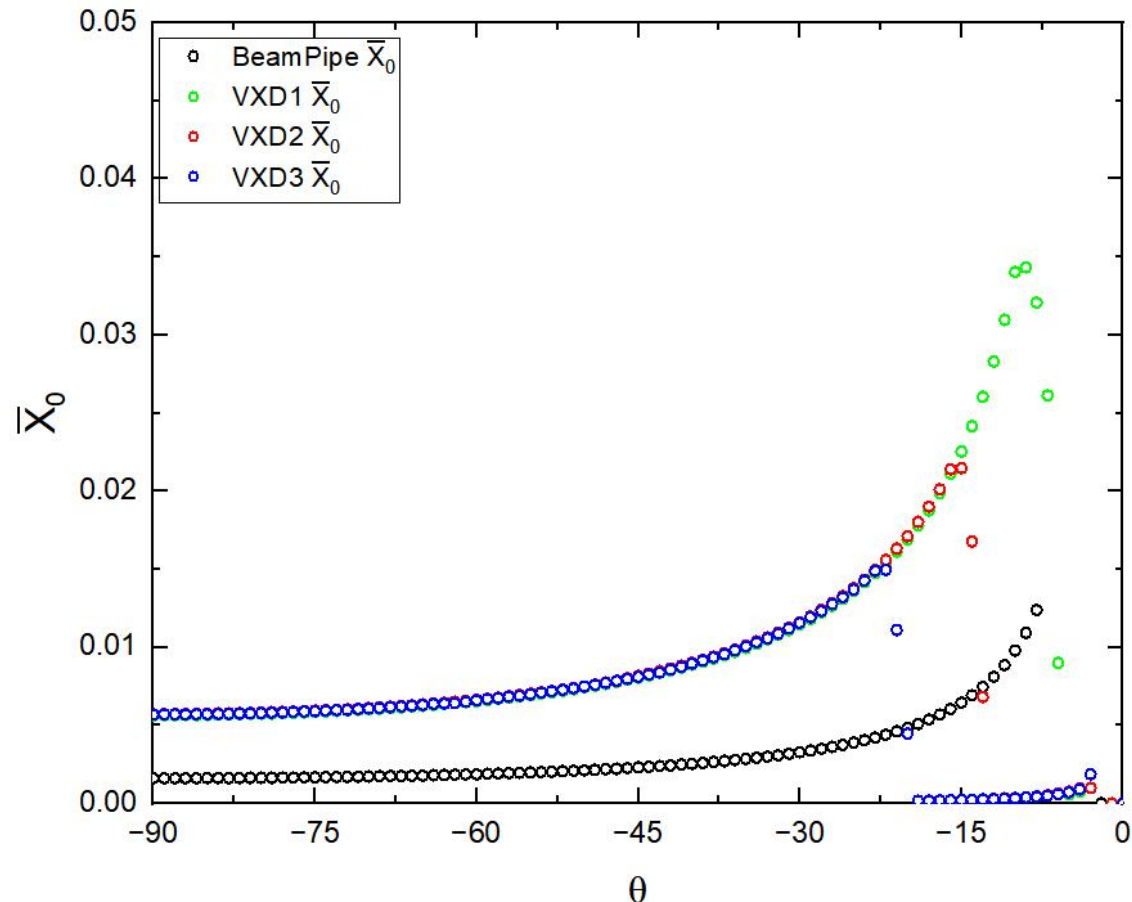
The average value $\overline{X_0}$ within the range of $\varphi \in (0,\ 360)$ varies with θ, with short barrel structure shown on the left and long barrel structure shown on the right.

➢ When $\theta = -90°$, the $\overline{X_0}$ corresponding to Beampipe, VXD1, and VXD2 are $0.00162X_0$, $0.00565X_0$, and $0.00676X_0$, respectively, which is higher than the CDR requirement of $0.30\%X_0$.

➢ As the θ decreases, the $\overline{X_0}$ increases.

VTX-d_0 resolution
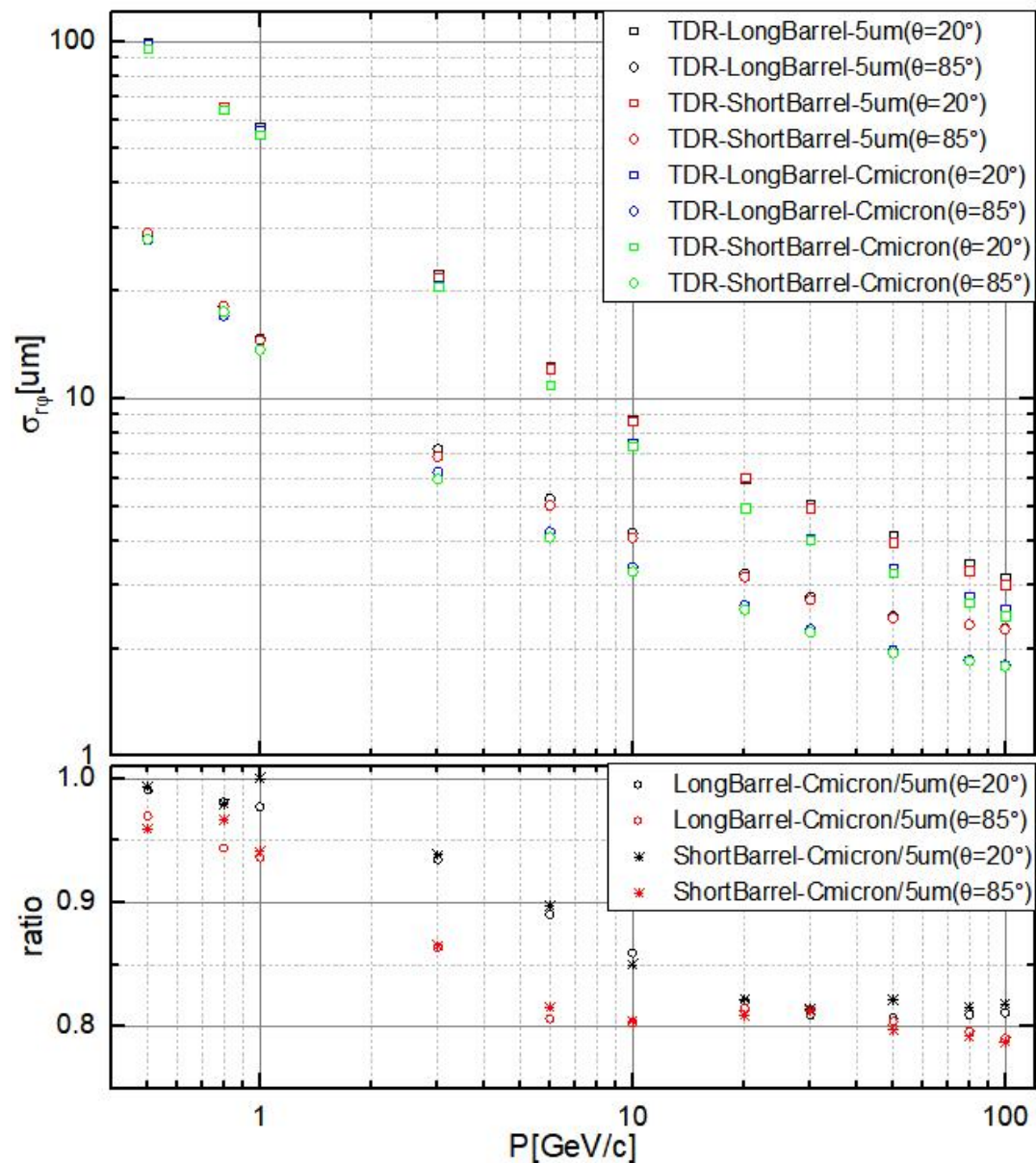
> ➤ Using the long barrel structure and the short barrel structure, within the momentum range of $P \in (10, 100)GeV/c$, the resolution of vertex has a significant impact on d_0 resolution, and vertex with Cmicron has an improvement of nearly 20% compared to vertex with 5um;
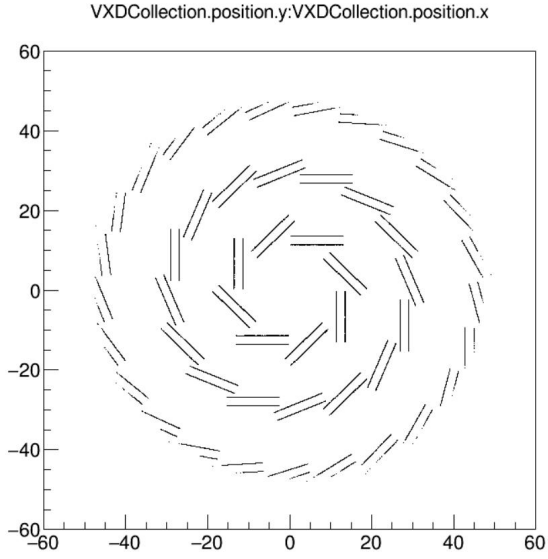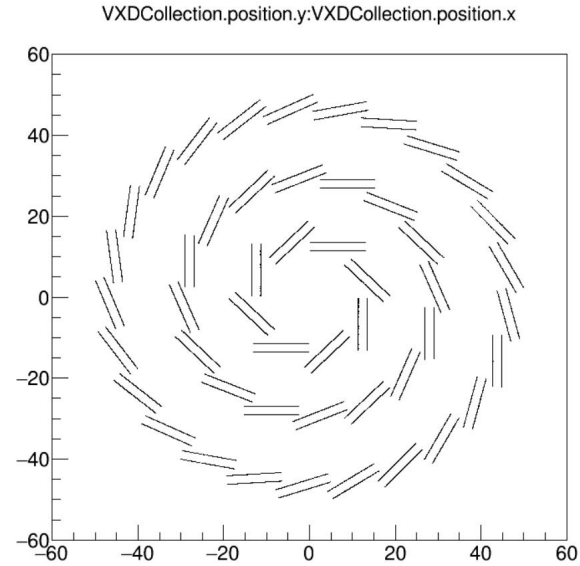
VTX-Next Plan

➢ Study whether there is a structure with smaller overlap;

➢ Summarize the impact of different structures on d_0 resolution;

➢ Using M11 matrix to improve the geometric parameters of some vertex detectors.
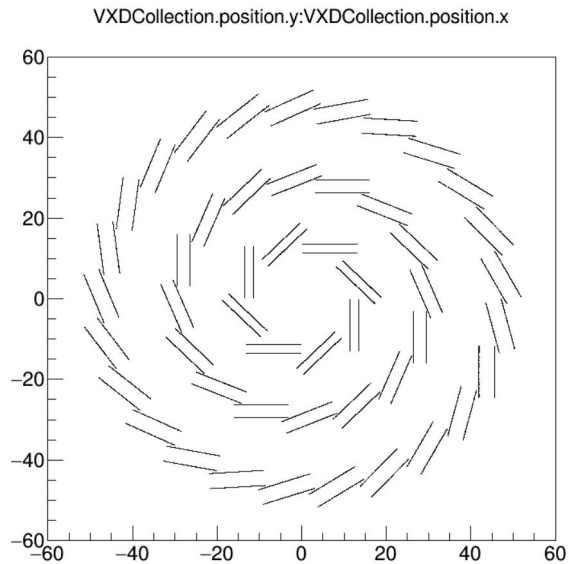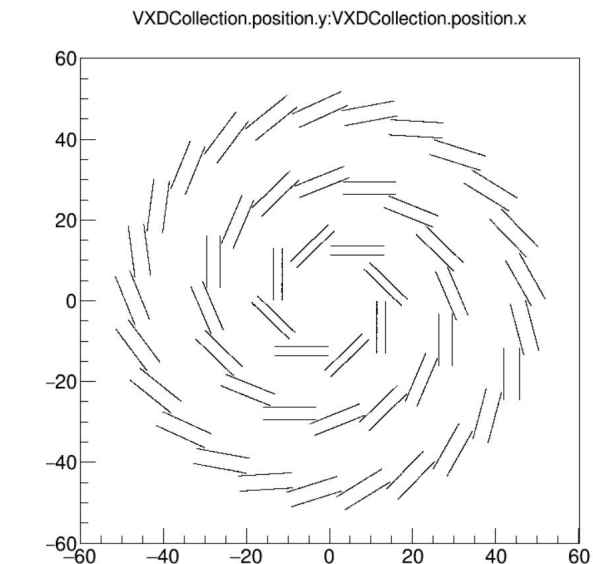
Thanks for Your Attention

VXDCollection.position.y:VXDCollection.position.x

VXDCollection.position.y:VXDCollection.position.x

VXDCollection.position.y:VXDCollection.position.x

TDR_SB_1GeV_20

TDR_SB_1GeV_85

VXDCollection.position.y:VXDCollection.position.x

VXDCollection.position.y:VXDCollection.position.x

TDR_LB_1GeV_20

TDR_LB_1GeV_85