General plan

- Optimize vertex tracker geometry of CLD:
 - study acceptance (Theta)
 - optimize layout (geometries):
 - Iow material budget
 - maximum coverage in terms of total number of hits crossed
 - study two possible alternatives:
 - Iong barrel flat geometry
 - tilted geometry



Week of 02/06/25 - 06/06/25

Estrella Cayuelas Solano

z_r plots

- we can test geometry by changing their values in the xml files.
- \$K4GEO/FCCee/CLD/compact/CLD_o2_v05

<include ref="\${DD4hepINSTALL}/DDDetectors/compact/detector_types.xml"/>
<include ref="Beampipe_o4_v05.xml"/>
<include ref="BeamInstrumentation_o3_v02_fitShield.xml"/>
<include ref="LumiCal_o3_v02_03.xml"/>
<include ref="Vertex_o4_v07_smallBP.xml"/>
<include ref="InnerTracker_o2_v07.xml"/>
<include ref="CalBarrel_o2_v07.xml"/>
<include ref="ECalBarrel_o2_v01_03.xml"/>
<include ref="ECalBarrel_o2_v01_03.xml"/>
<include ref="HCalBarrel_o1_v01_01.xml"/>
<include ref="HCalBarrel_o1_v01_01.xml"/>

<include ref="Solenoid_o1_v01_02.xml"/>

<include ref="YokeBarrel_o1_v01_02.xml"/>
<include ref="YokeEndcap_o1_v01_02.xml"/>



<constant name="VertexBarrel_r1" value="1.3*cm"/> <constant name="VertexBarrel_r2" value="3.5*cm"/> <constant name="VertexBarrel_r3" value="5.7*cm"/>

> In Vertex of v07 smallBP vml

z_r plots

• To create .root file:

ddsim

--compactFile \$K4GEO/FCCee/CLD/compact/CLD_o2_v05/CLD_o2_v05.xml

--inputFiles

/eos/experiment/fcc/users/j/jaeyserm/guineapig/gen/guineaPig_andrea_June2024_ v23/data99.pairs

could be changed to IDEA

--outputFile \test.root

-N 1 (Number of events to simulate)

--crossingAngleBoost 0.015

z_r plots

- Then, plot using hitmaps.py
- <u>https://github.com/jeyserma/FCCPhysics/tree/main/beam_backgrounds/vtx</u>



Current focus: Material budget

• Goal: isolate material budget for (flat) vertex detector (inner, middle, outer barrels and disks)



Future objectives

- Plot total hits crossed
- Use material budget and total hits crossed to study various geometries (long barrel, tilted geometry, etc.)