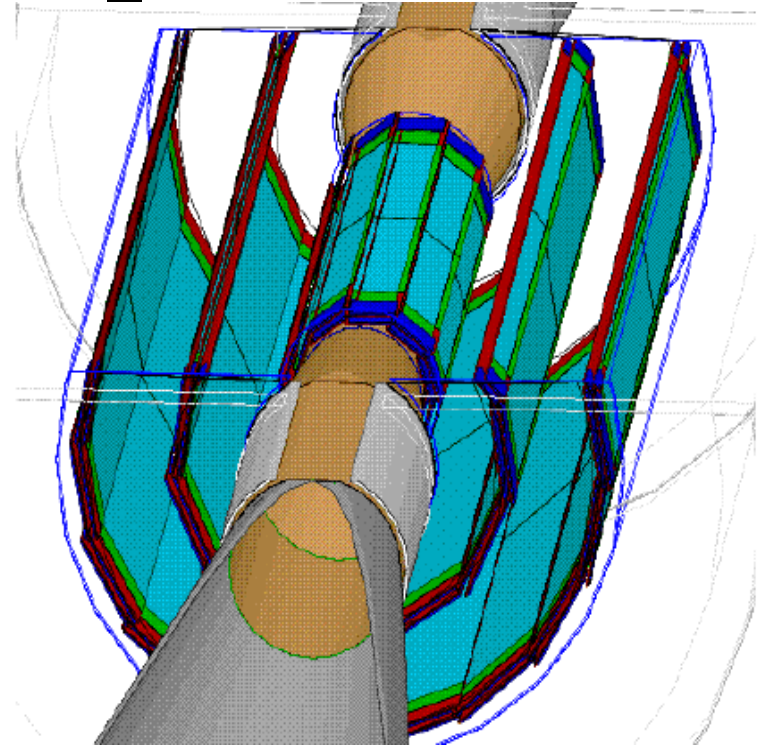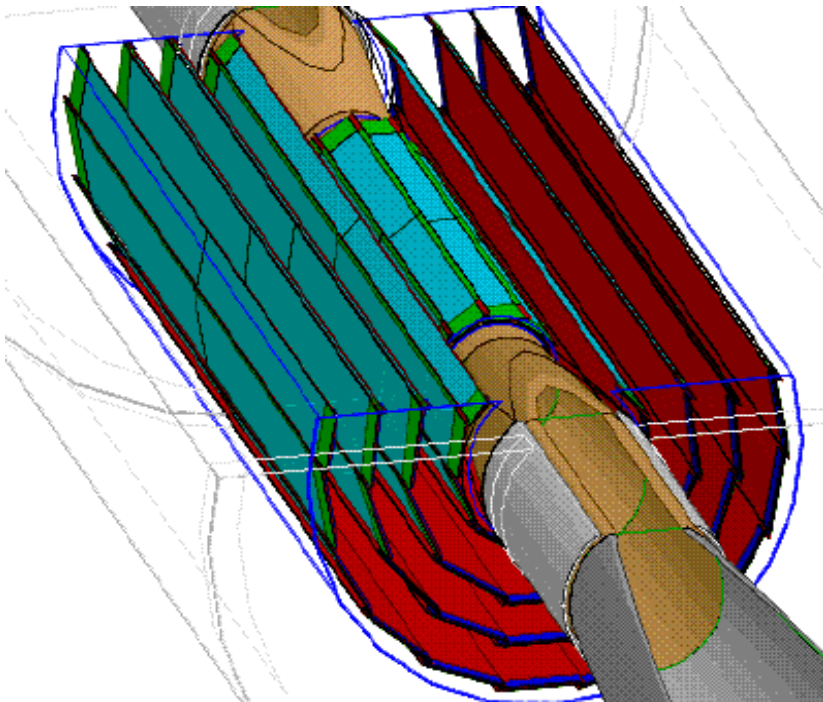# VXD issues in Mokka (and beyond)
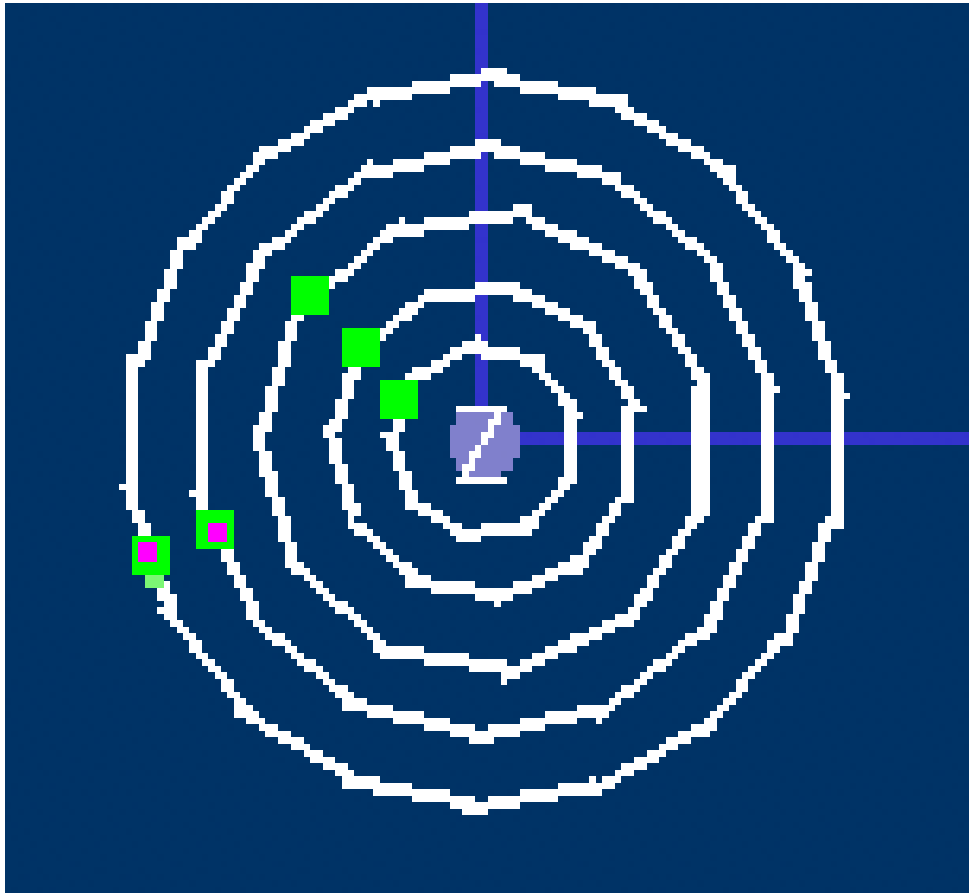
Frank Gaede
DESY
ILD Detector Optimization WG
Phone Meeting, December 6, 2007

new VXD models in Mokka

- two new VTX models : (D.Grandjean)
  - more flexible driver w/ LDC like 5 layer
  - GLD like layout w/ 3 double layers
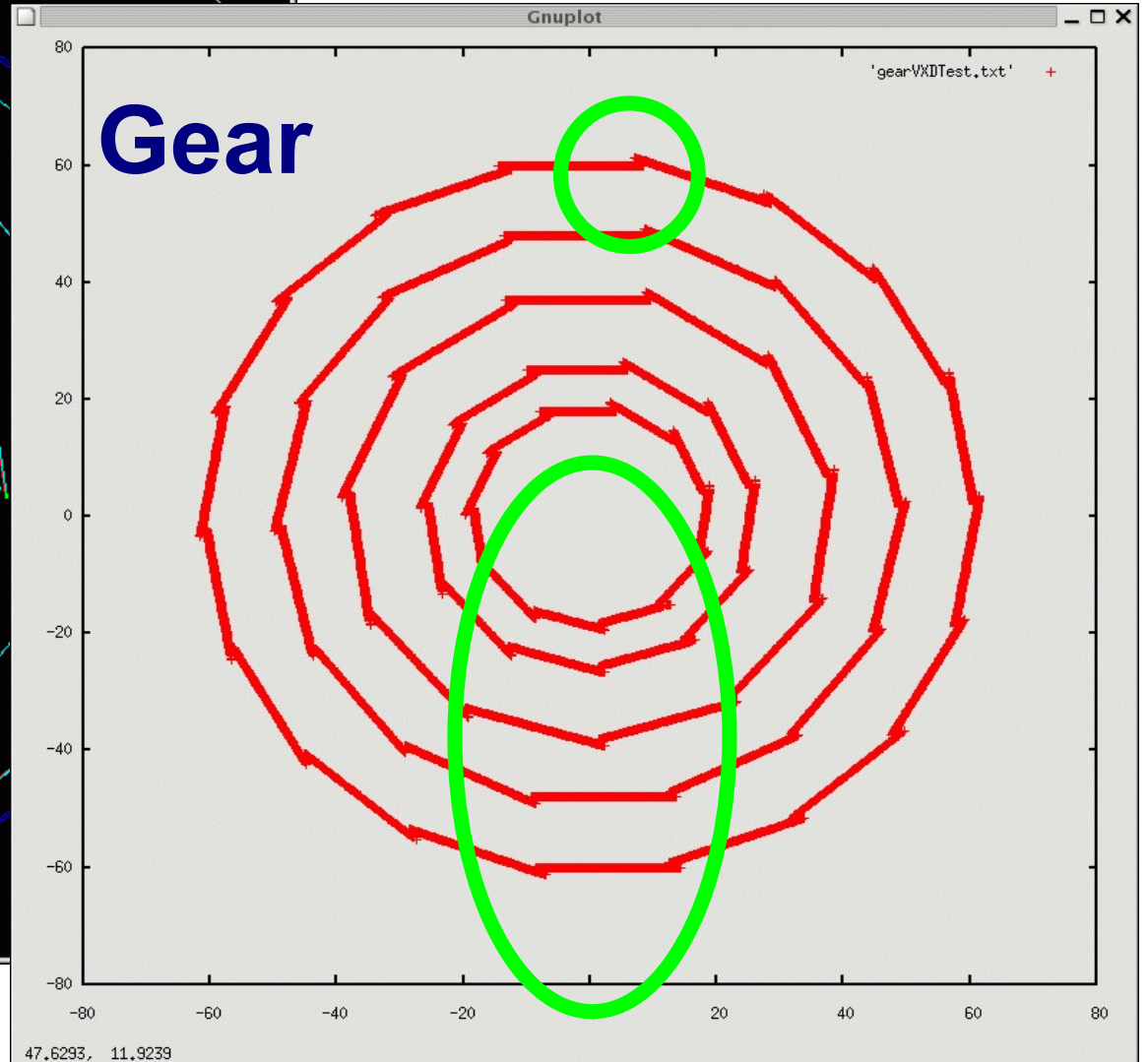- LDC like vxd03 used in
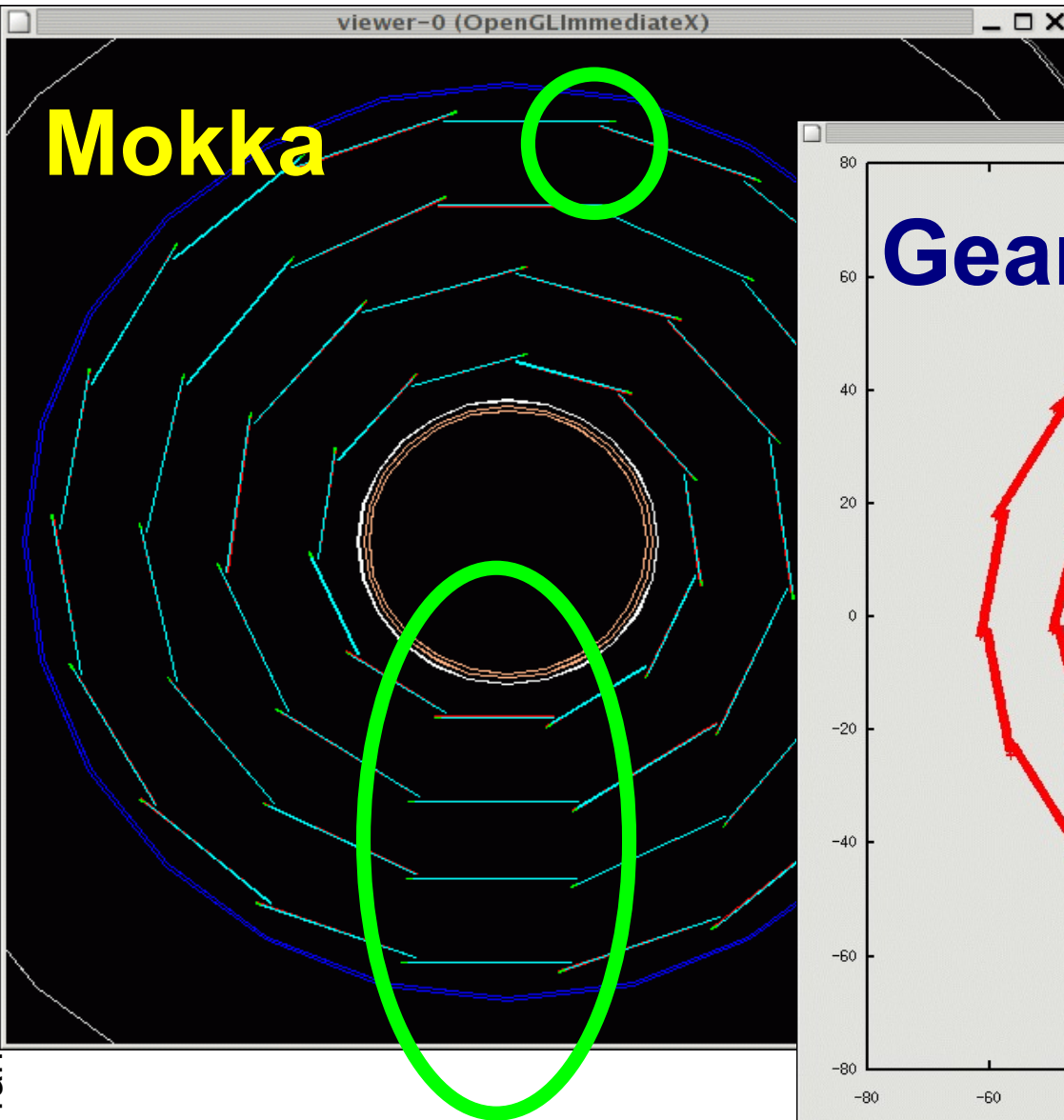 - LDC01_06Sc_test & LDCPrime_02SC_test

- strange problem in VTXDigitizer observed by Steve:
  - hits in innermost layers where translated to different ladder ....
  - not observed in older models vxd02
  - only 'major' change:
    - different #ladders/layer
    - odd in innermost

Mokka vs Gear

Mokka

Gear

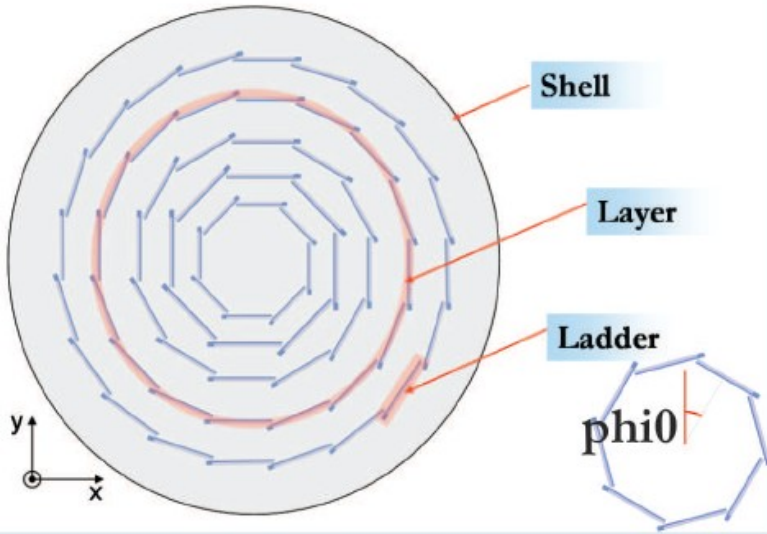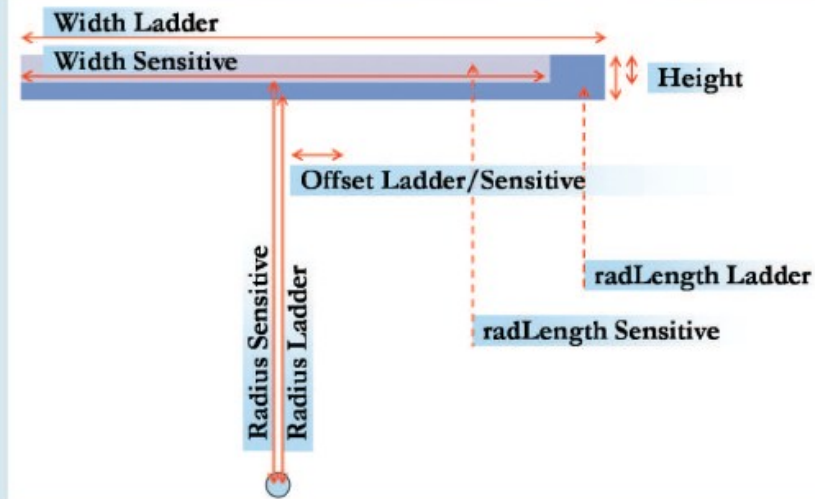gear parameters: phi0==0, offsets < 0

definition of phi0 and offset

VXDParameters

overview

Shell

Layer

Ladder

phi0

overview

Width Ladder
Width Sensitive
Height
Offset Ladder/Sensitive
Radius Sensitive
Radius Ladder
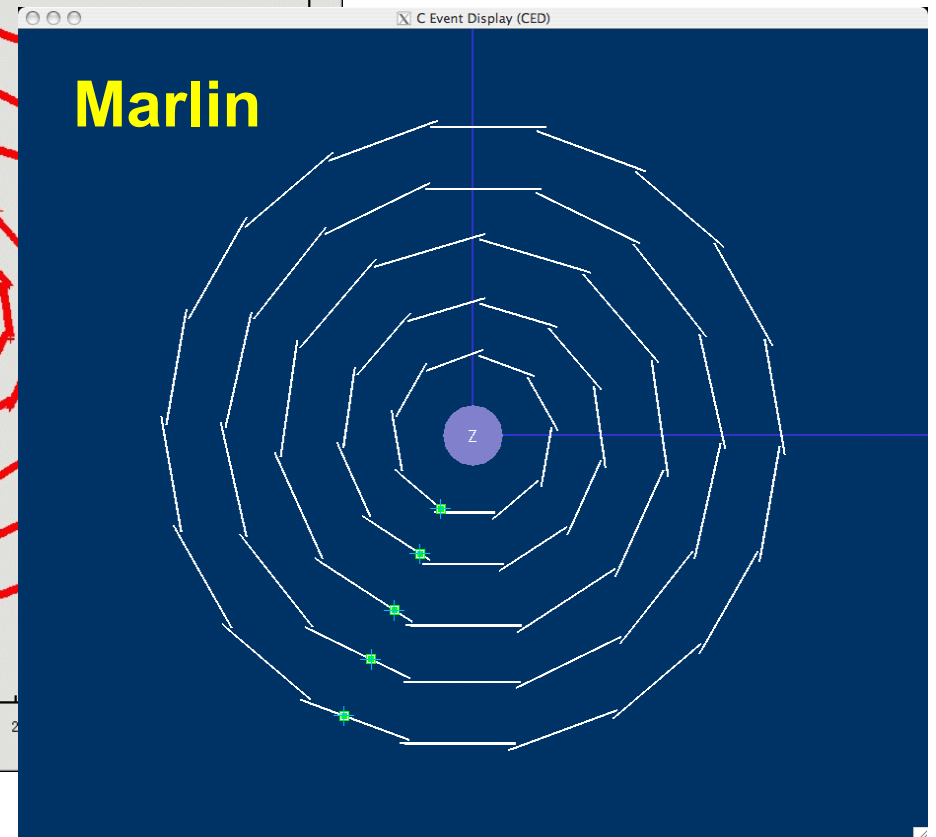radLength Ladder
radLength Sensitive

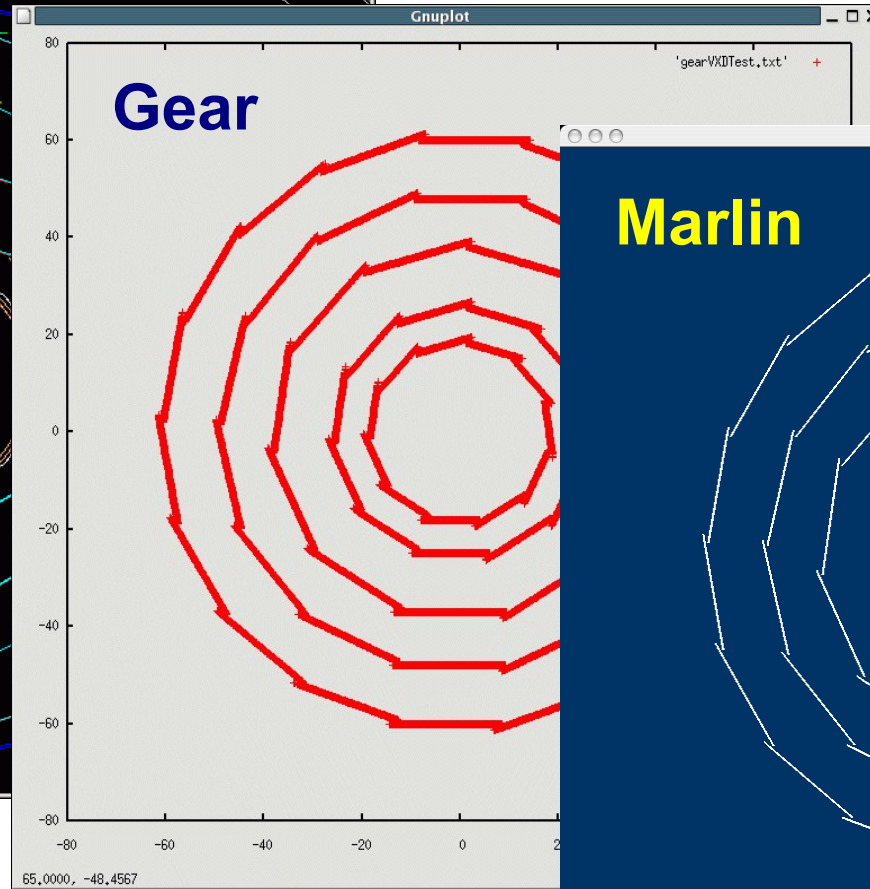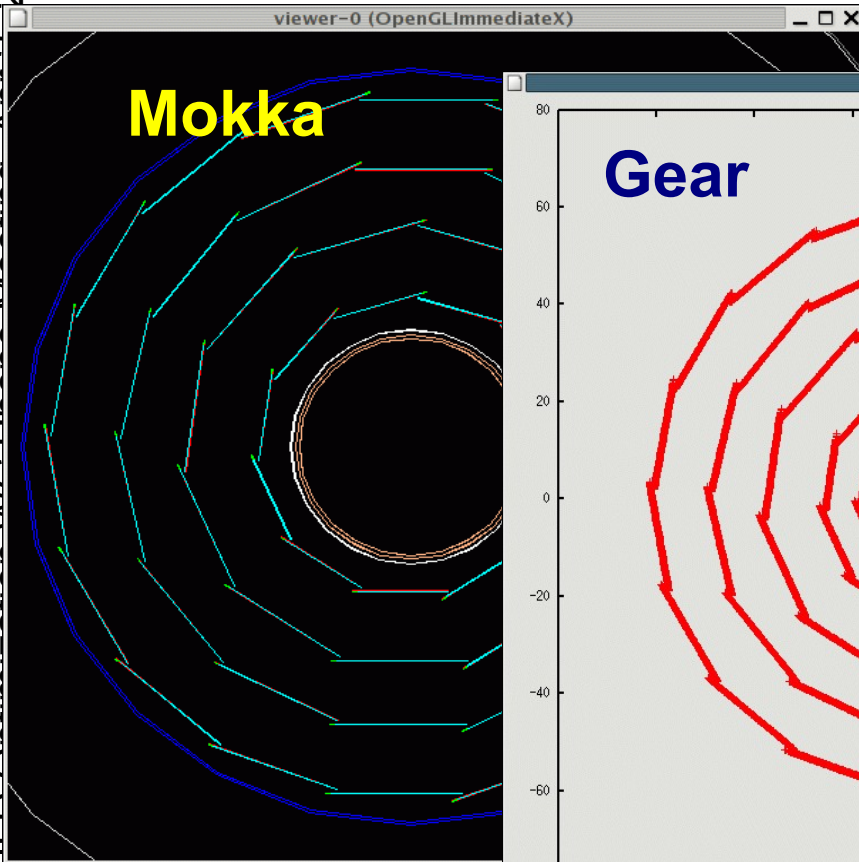- phi0: 'angle' of first ladder (meassured wrt. y-axis)

- offset: shift to create overlap (direction 'undefined')

- -> poor definition and documentation has lead to 3 programms using 3 different interpretations

- => this should be changed by introducing one 'natural' definition:

phi0: azimuthal angle of the (outward pointing) normal of the first ladder
offset: shift of ladder in direction of increasing phi

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fixed VXD parameters

will need patch releases of all three
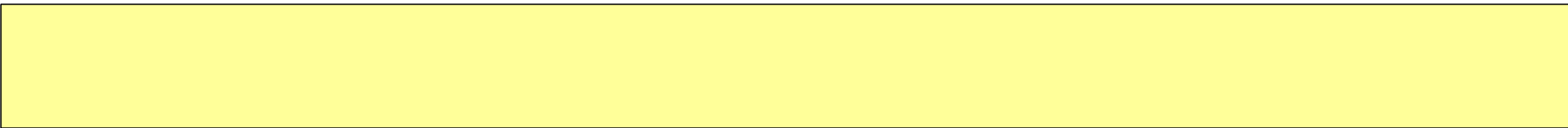
Mokka

Gear

Marlin

gear parameters: phi0== -PI/2, offsets < 0

with this central tracking works again !!

other issues

- thickness of support ladder has changed to 50 mu for all VXD models (was 282 mu)!

- -> change of global database parameter: VXD_support_ladder_thickness !?

    - global parameters should never change in order to ensure reproducability of results

- how is the VXD ladder radius defined, eg:

    - innermost surface of support ladder (old VXD models)

    - innermost surface of sensitive ladders (new models)

    - meassurement surface, middle of sensitive ?

    - -> not a problem – just a convention ...

additional material

LDCPrime

Sub-Detector	Parameter	GLD	LDC	GLD'	LDC'
TPC	R_{inner} (m)	0.45	0.30	0.45	0.30
	R_{outer} (m)	2.00	1.58	1.80	1.80
	Z_{max} (m)*	2.50	2.16	2.35	2.35
Barrel ECAL	R_{inner} (m)**	2.10	1.60	1.85	1.82
	Material	Sci/W	Si/W	Sci/W	Sci/W
Barrel HCAL	Material	Sci/W	Sci/Fe	Sci/Fe	Sci/Fe
Endcap ECAL	Z_{min} (m)***	2.80	2.30	2.55	2.55
Solenoid	B-field	3.0	4.0	3.50	3.50
VTX	Inner Layer (mm)	20	16	18	18

- current mokka models:
  - LDC01_06Sc_test
  - LDCPrime_02Sc_test
  - _test will go away, once models are frozen

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