ILD simulation models for circular collider

previous presentation in ILD meeting: https://agenda.linearcollider.org/event/10055

Daniel Jeans KEK/IPNS @ ILD meeting, 30th Aug 2023

ILD_l5_v02
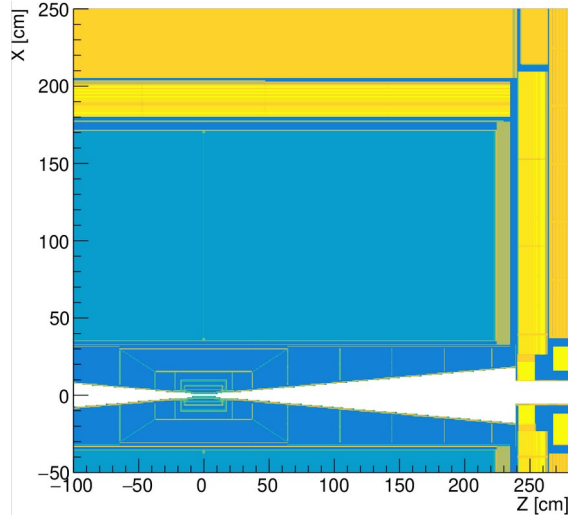
to fit ILD into FCCee or another circular collider,
    need significant changes to
        Machine Detector Interface and therefore also
           forward calorimeters
           inner tracking geometry

detector model CLD = Clic-Like-Detector
    designed to fit FCCee
    distant cousin of ILD
    model exists in same software framework (DD4hep)
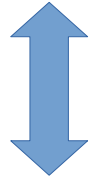   different sub-detector designs / drivers
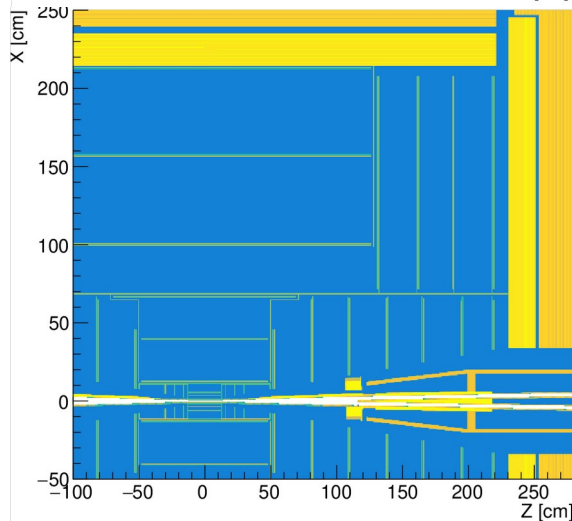
(there are also many technical changes necessary
  e.g. power-pulsing, cooling, DAQ …
    whose implications may require additional updates of the model.
    I don't discuss those today.)

FCCee_o2_V02 "CLD"

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3 models to support *your* studies

current ILD @ ILC : ILD_l5_v02
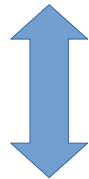
impact of alternative inner silicon design

ILD' @ ILC
    MDI : as current ILD   3.5 T
    inner tracking : scaled version of CLD
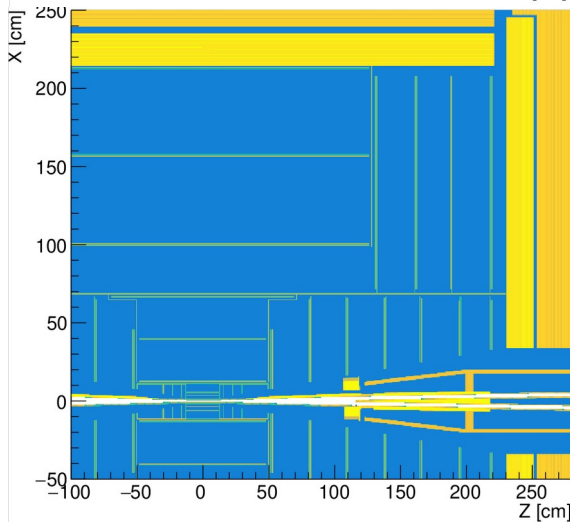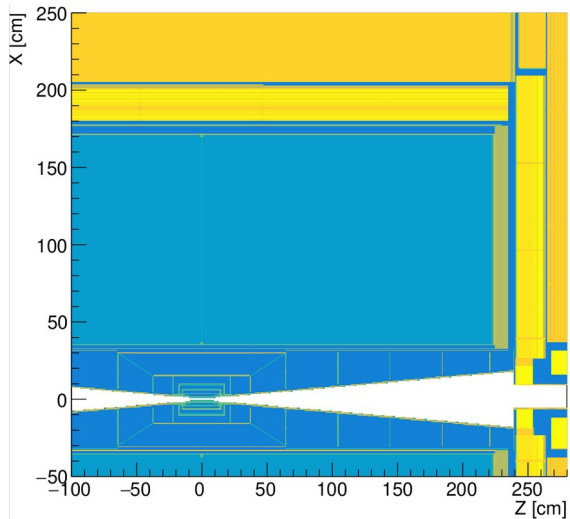
impact of different MDI systems

ILD' @ FCCee
    MDI : copy of CLD   2 T
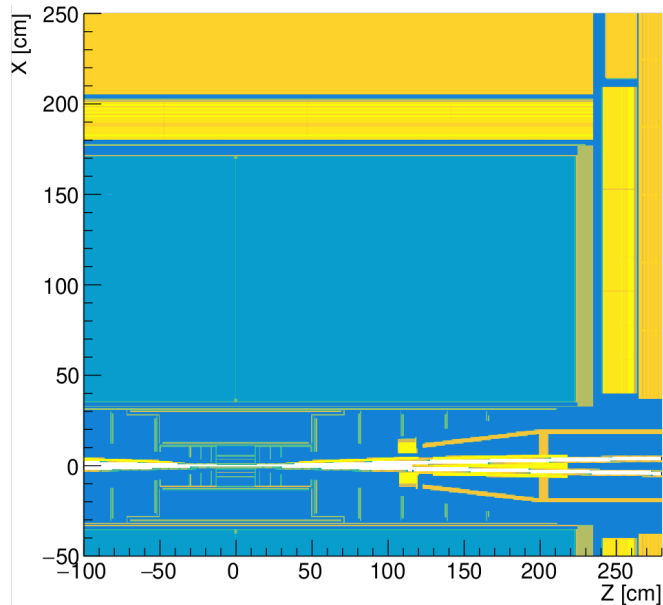   inner tracking : scaled version of CLD

TPC & main calos identical

ILD_l5_v02

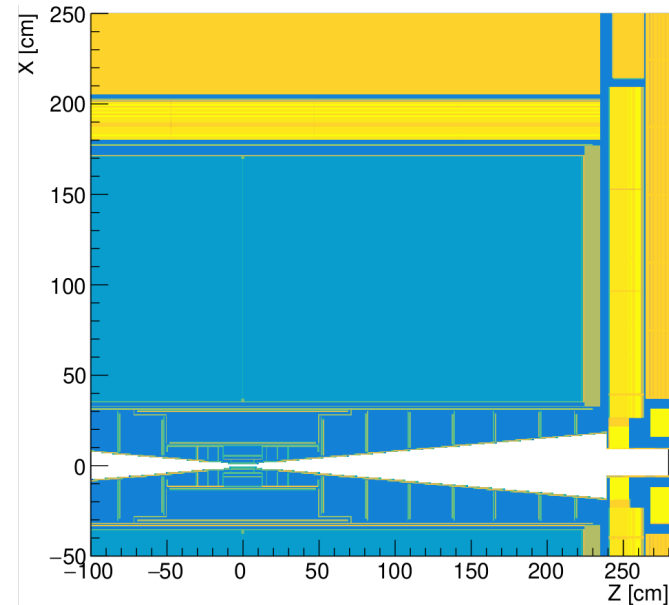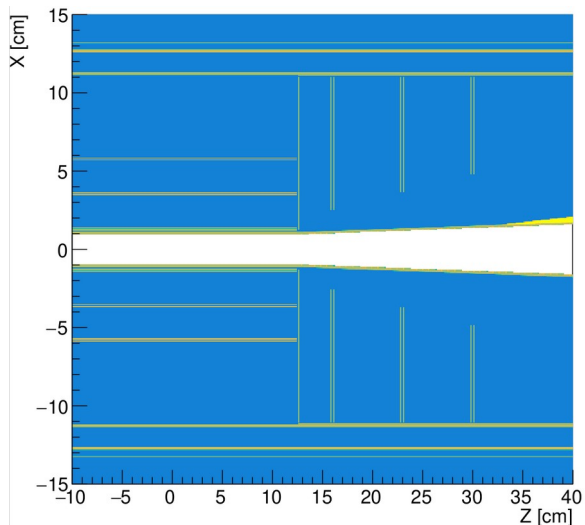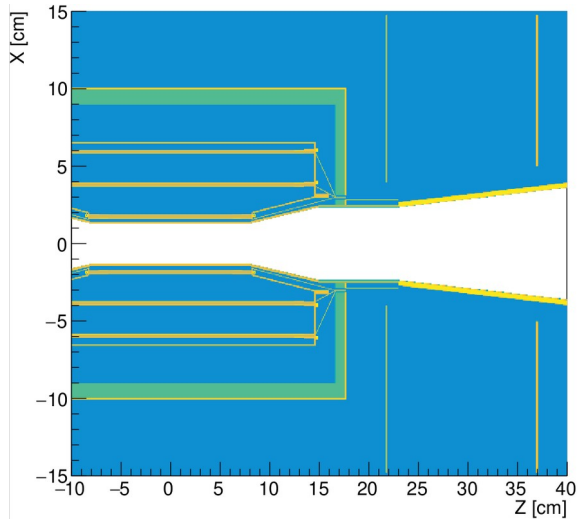# FCCee_o2_V02 "CLD"

ILD' @ FCCee

MDI & VTX: copied from FCCee/CLD
inner trk: adapted from FCCee/CLD
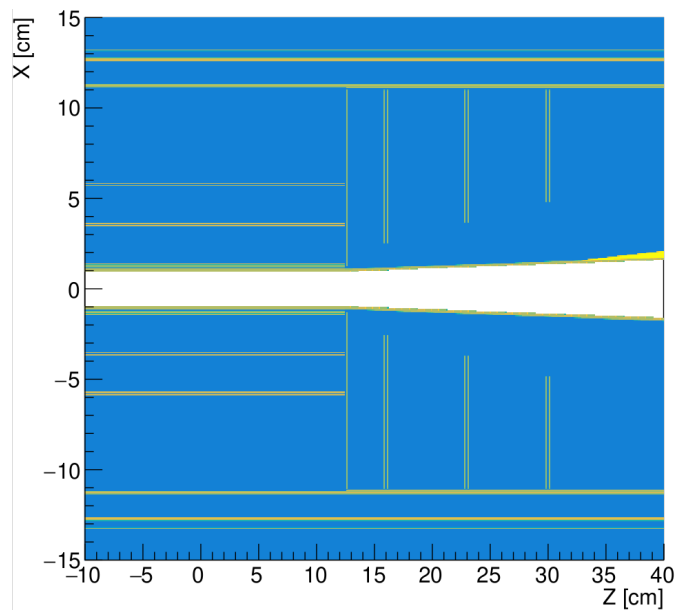**remove ECAL ring, LHCAL, beamcal**

ILD' @ ILC

MDI: copied from ILD
VTX/inner trk: adapted from FCCee/CLD
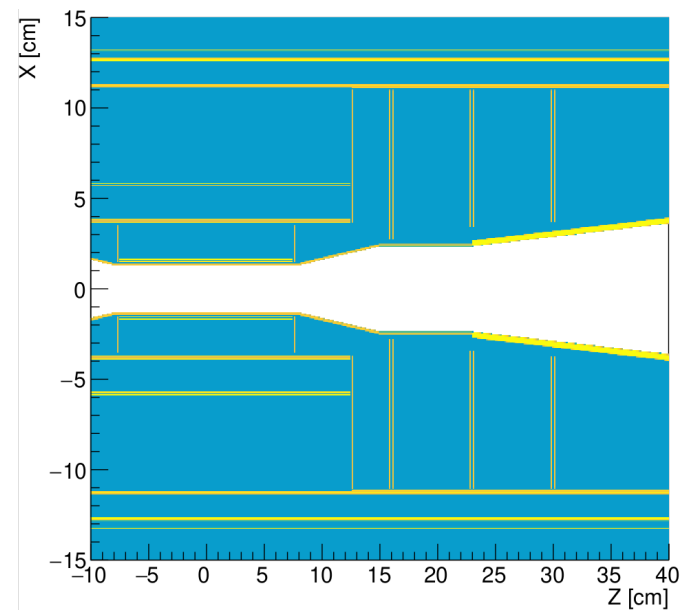
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ILD_l5_v02

FCCee_o2_V02 "CLD"

ILD' @ FCCee

MDI & VTX: copied from FCCee/CLD
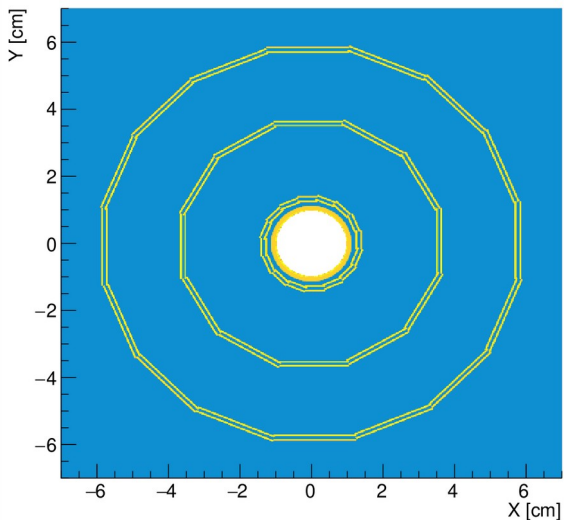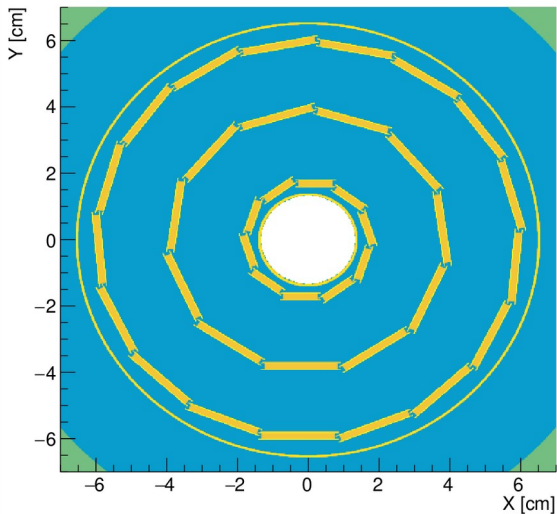inner trk: adapted from FCCee/CLD

ILD' @ ILC

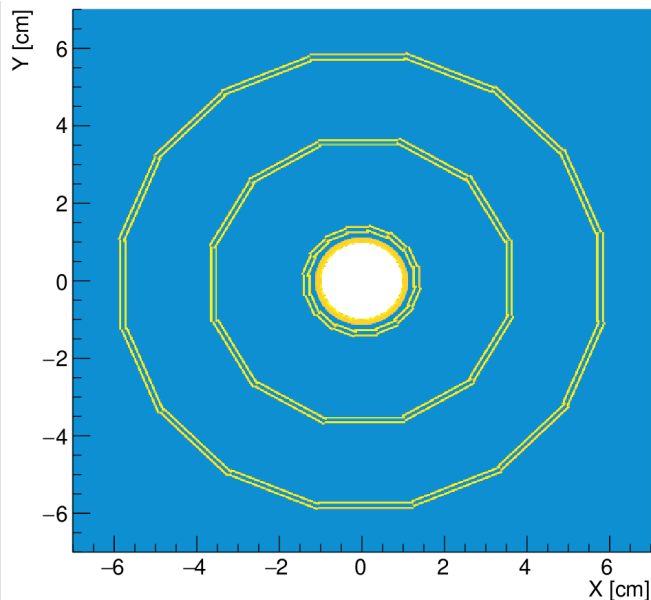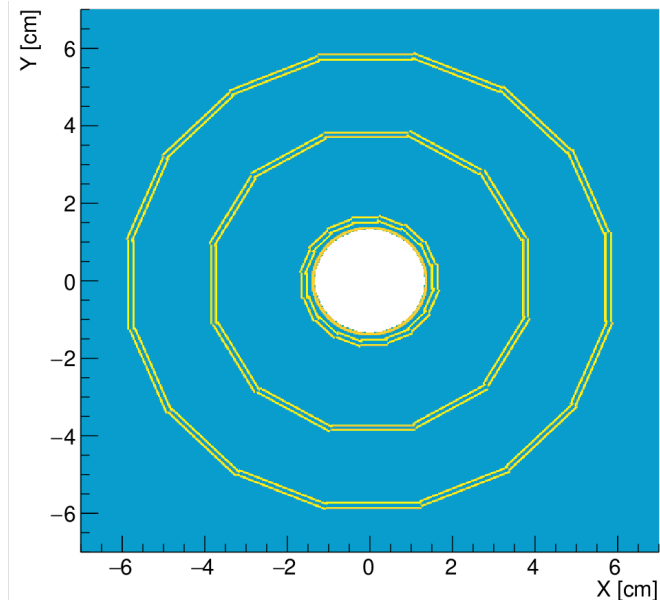
MDI: copied from ILD
VTX/inner trk: adapted from FCCee/CLD

**shorter 1st layer,
slightly larger radius L1,2**

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ILD_l5_v02

ILD' @ FCCee

ILD' @ ILC

FCCee_o2_V02 "CLD"
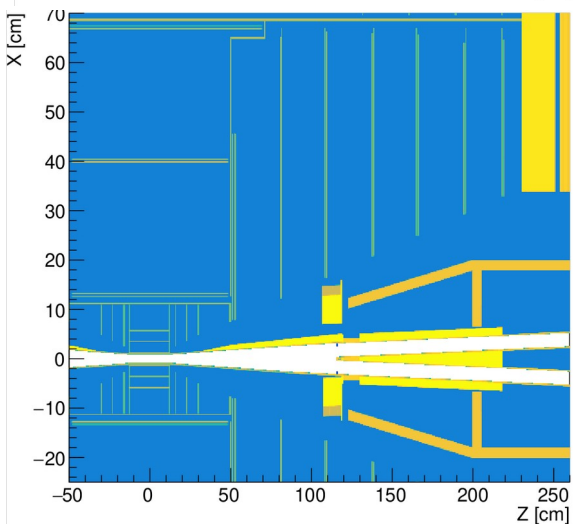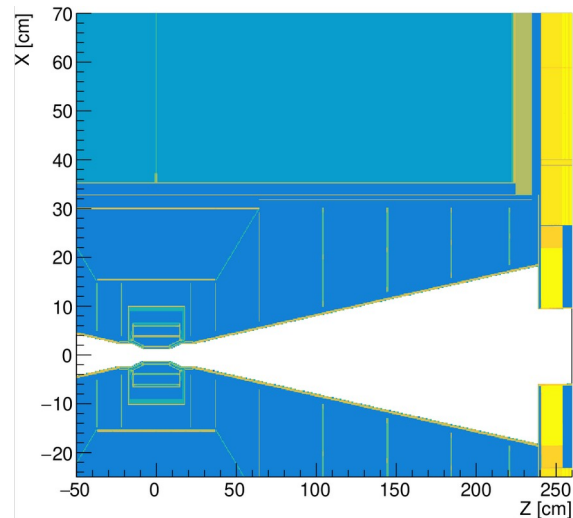
MDI & VTX: copied from FCCee/CLD
inner trk: adapted from FCCee/CLD

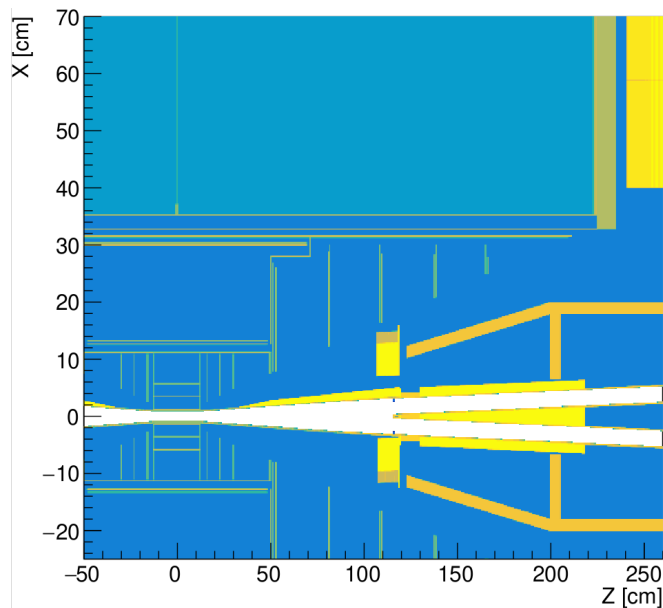MDI: copied from ILD
VTX/inner trk: adapted from FCCee/CLD

adjust radii (larger beampipe)
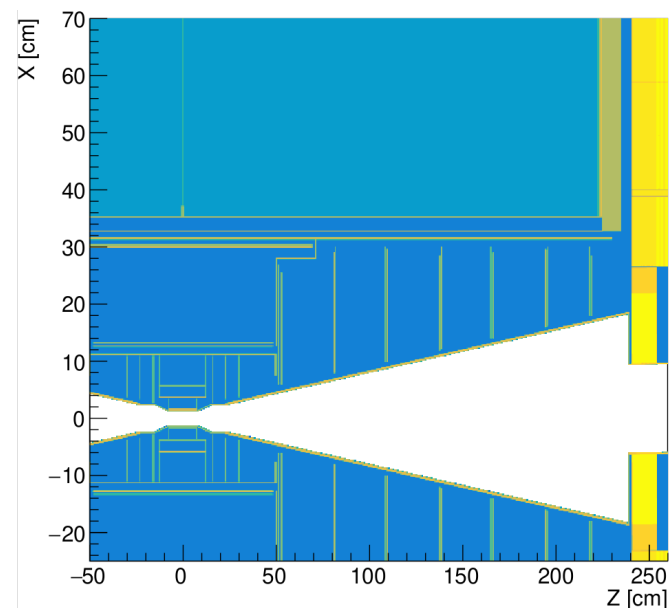
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ILD_l5_v02

ILD' @ FCCee

MDI & VTX: copied from FCCee/CLD
inner trk: adapted from FCCee/CLD

**reduce inner trk to fit into TPC
reduce inner barrel to 2 layers (~SIT)**

ILD' @ ILC

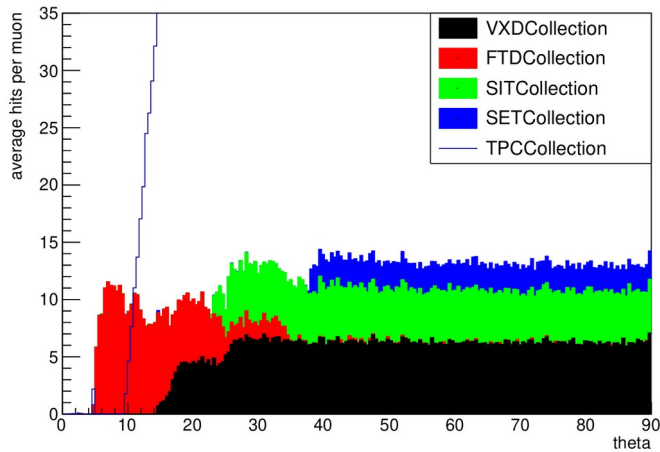MDI: copied from ILD
VTX/inner trk: adapted from FCCee/CLD

FCCee_o2_V02 "CLD"

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number of tracker hits for 100 GeV muons

usual ILD@ILC　　　　　　　　ILD' @ FCCee　　　　　　　　ILD' @ ILC
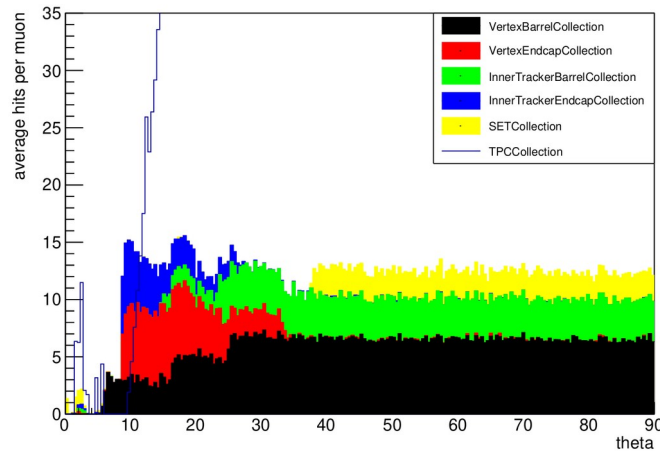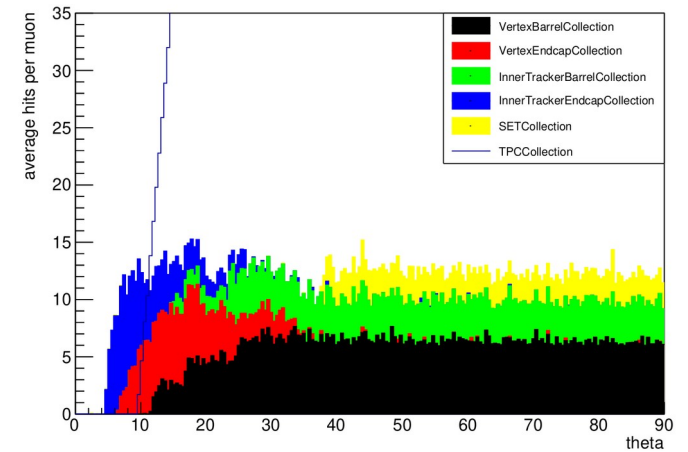
material budget along straight lines from origin

θ=15 deg

theta = 15.0

θ=45 deg

theta = 45.0

θ=85 deg

theta = 85.0

distance from IP [cm]

usual ILD@ILC
ILD' @ FCCee
ILD' @ ILC

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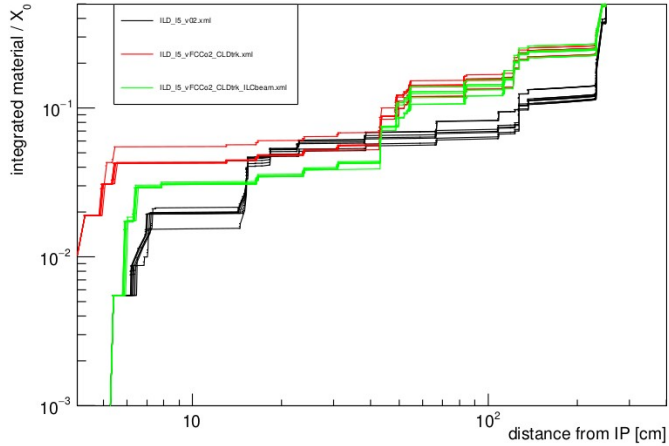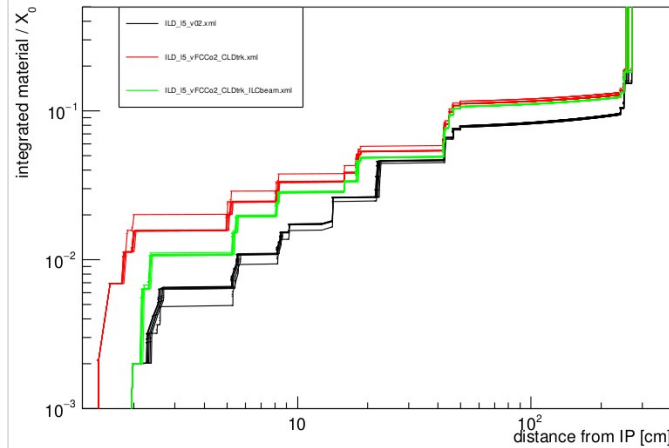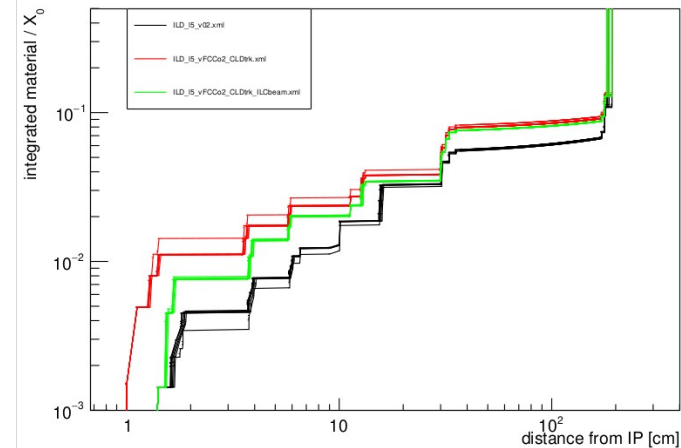
propose 2 new models to help ILD@FCCee studies
    borrowing elements from CLD model

* ILD@ILC with CLD-like inner tracking   → ILD_l5_v10

* ILD@FCCee with CLD-like MDI and inner tracking   → ILC_l5_v11

pull request at https://github.com/key4hep/k4geo/pull/288

reminder: we also have an "all-silicon" ILD model   → ILD_l5_v09

if you are interested in models with further alterations,
    get in touch !