# What about ECAL in the possible change of dimensions?

for the current baseline ECAL
as a sandwich of W radiator and Si detecting medium

We are not considering here the option to go to Pb
or to use MAPS for detection

The idea was that some reshuffling of the detector
could help making it easier to build, cheaper
without sacrificing anything important
in terms of performances.

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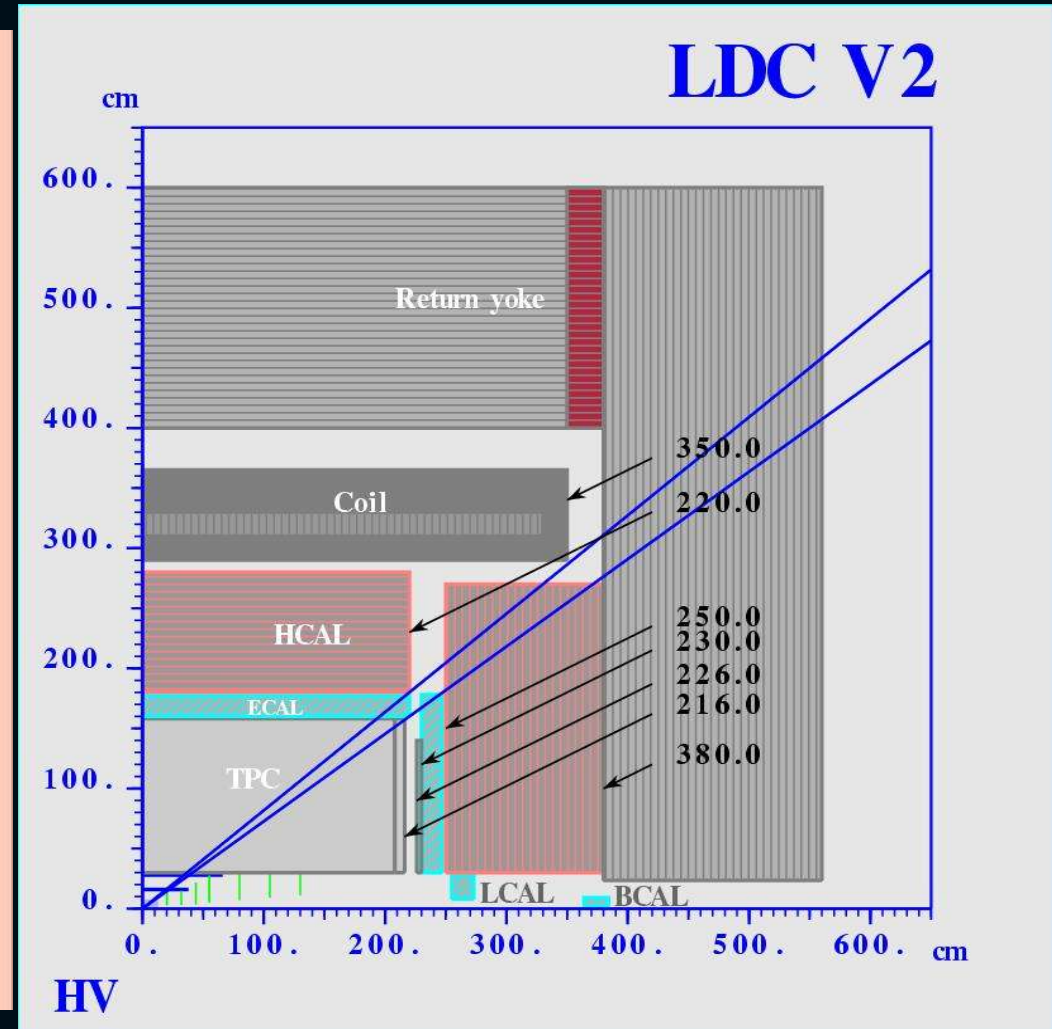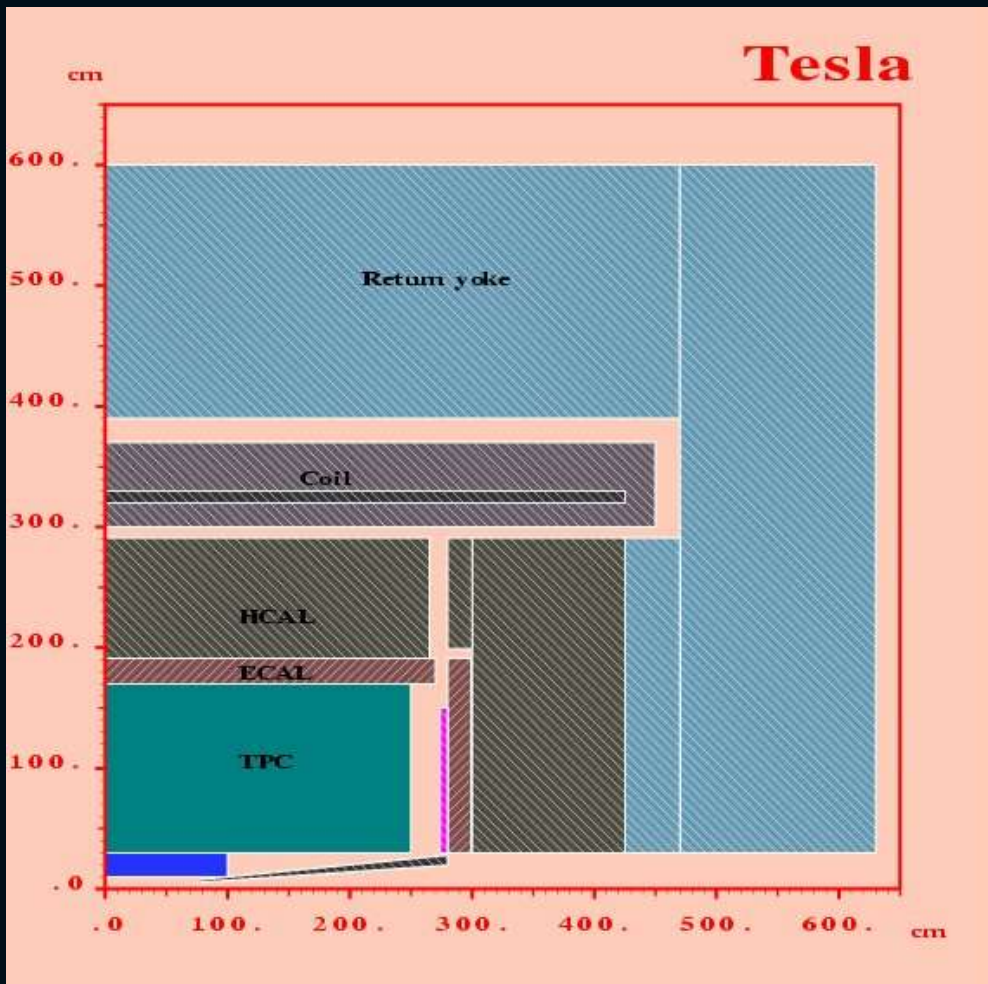
There are two aspects: one internal to the calorimeter design
the other related to the overall dimensions.

The first aspect
was driven by some detector and technical studies
together with the conclusion that the electromagnetic
energy resolution was not the first priority for PFA.

Relaxing on the energy resolution (30 layers instead of 40)
with an electronics embedded in the calorimeter leads to
a more compact calorimeter 17cm (overall) instead of 21.
The reduced Moliere radius together with a reduced cell size
puts less stringent conditions on distances from the IP.

We could then consider the following changes in dimensions

ECAL barrel inner radius: 1.70   to   1.60 m
barrel length: 2.70 to 2.20

this is directly related to the module and
wafer structure we consider:
5 modules in a stave, 7 alveoli in a module
an alveolus compatible with a square
                    inscribed in a 8 inch wafer.

Ecal endcap front: 2.80 to 2.30

The end cap external radius changes to adjust to the new
angle of separation between barrel and end cap.
32 to 36 degrees. 1.91 to 1.77 (not really studied)

This change makes the incidence of photons to
the calorimeter less shallow, less backscattering.

For the calorimeter the change in external dimensions
 does not hurt anything,
the number of layers degrades slightly the energy resolution

OK

The silicon area goes down by more than 30%

Questions:

     should the baseline have 30 layers degrading the resolution ?

     should we have two different thicknesses (.6 and 1.2 X^0)?

      with the disturbance it makes in the corners?

Reminder for those who stay in front of the ECAL:

Importance of reducing the material in front of the Ecal
Importance of having it as close as possible to the ECAL

In particular interaction length is much worse than
radiation length singularly when a TPC provides
a very neat reconstruction of pairs
(even though radiation length is not to be neglected).