

Status of DHCAL simulation in Mokka

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(with help from G. Musat and P. Mora de Freitas)

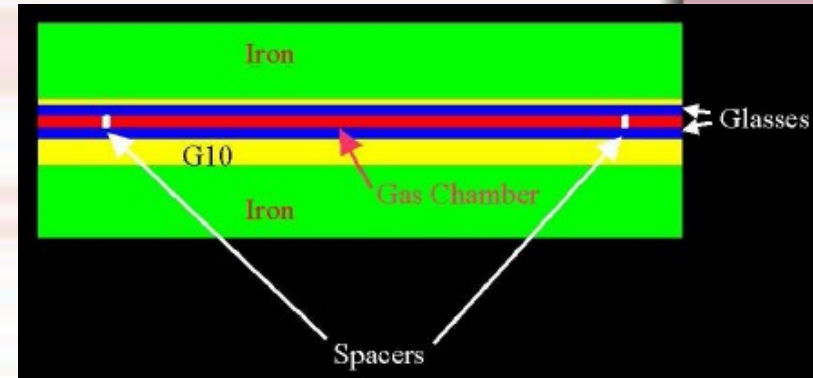
ILD software meeting, December 2nd 2009

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The various DHCAL.

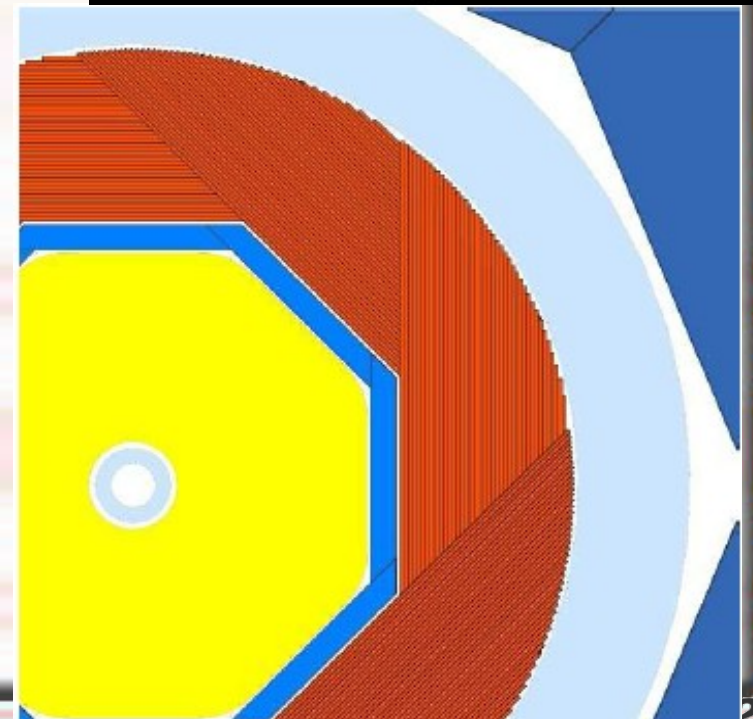
There is an “old” version of the DHCAL based on the TESLA design in `Mokka/source/Geometry/Tesla/HCal03.cc`
The geometry is the “TESLA” geometry (AHCAL-like) where it is possible to simulate either AHCAL or DHCAL in the same geometry.

This is mostly historical. The RPC is a simplified RPC.



The newer DHCAL driver with DHCAL geometry “à la Videau” is in `Mokka/source/Geometry/LDC/SHcal04.cc`
This DHCAL has an improved, more realistic description of RPC.
No scintillator version with this geometry.

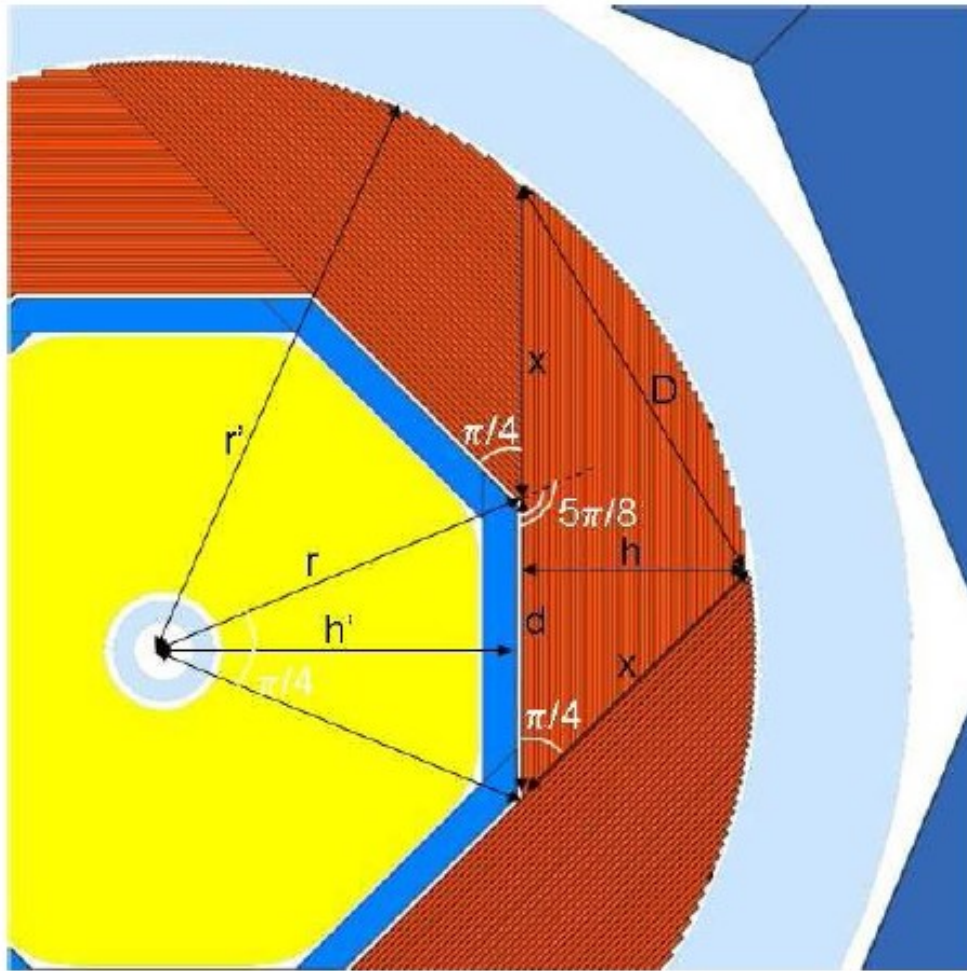
This can be used in detector model
`ILD_00Dhcal` (i.e. `ILD_00` with DHCAL)
`ILD_00fw_Dhcal` (i.e. `ILD_00fw` with DHCAL)



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The "Videau" geometry.

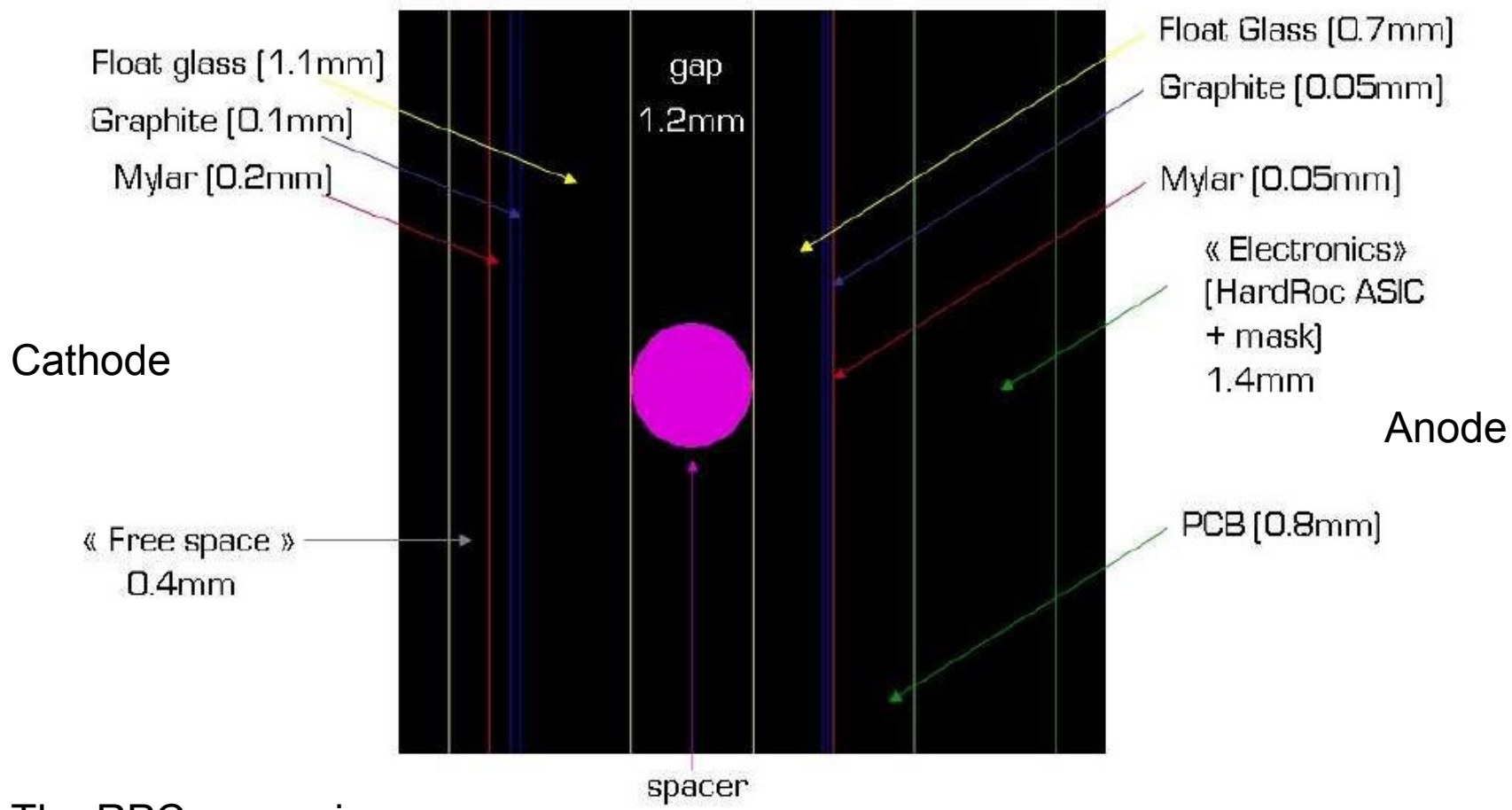


The geometry is parametrized by 3 quantities :

- Number of layers
- Outer radius (r')
- Distance between center and first plate (h')

In Pandora, the DHCAL geometry is identified by the presence of the outer radius parameter in the GEAR file.

The RPC.

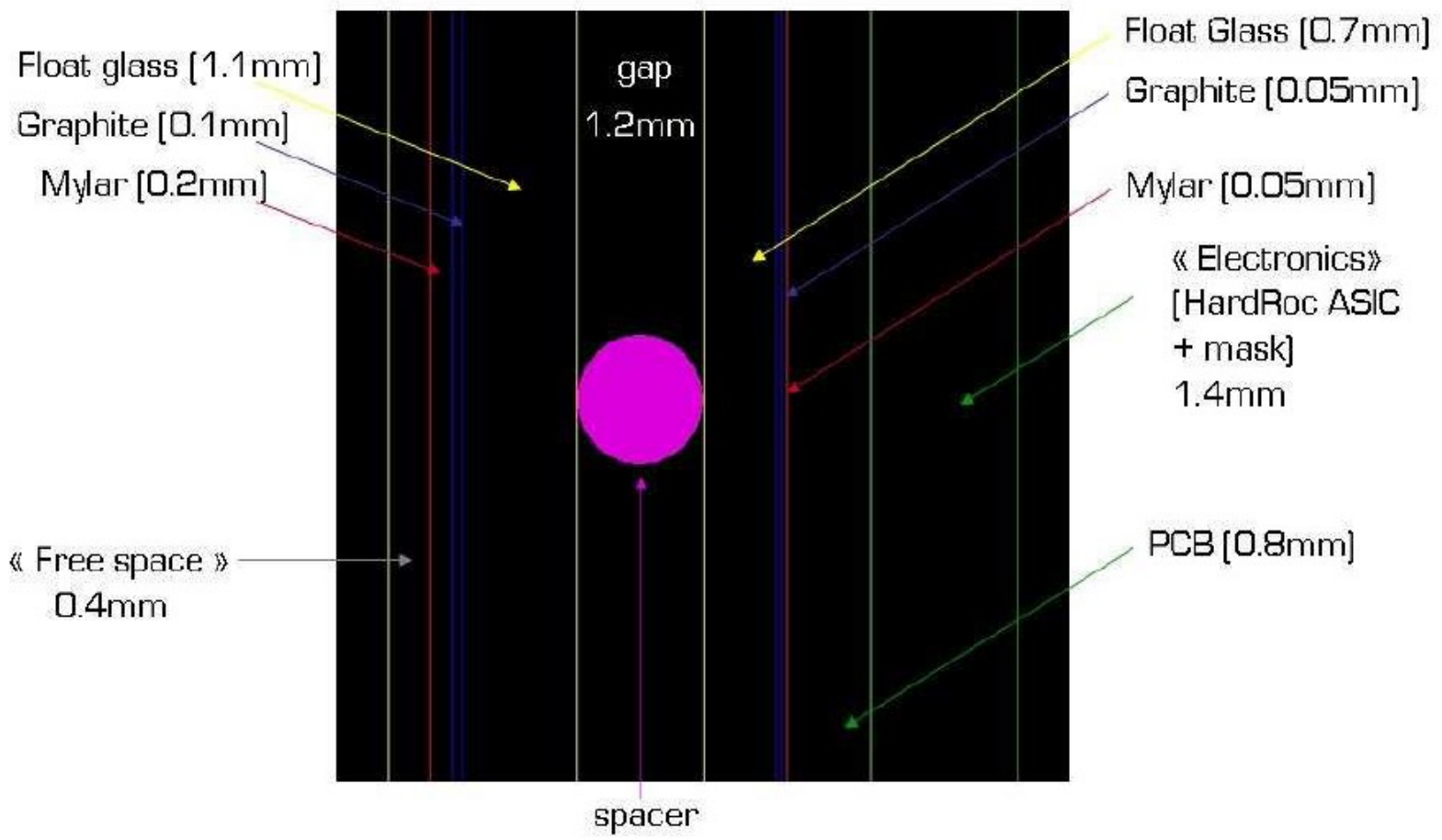


The RPC cross-view :

Recent needed changes are : Graphite thickness (cathode) = 0.05 mm
 Mylar thickness (cathode) = 0.0175 mm

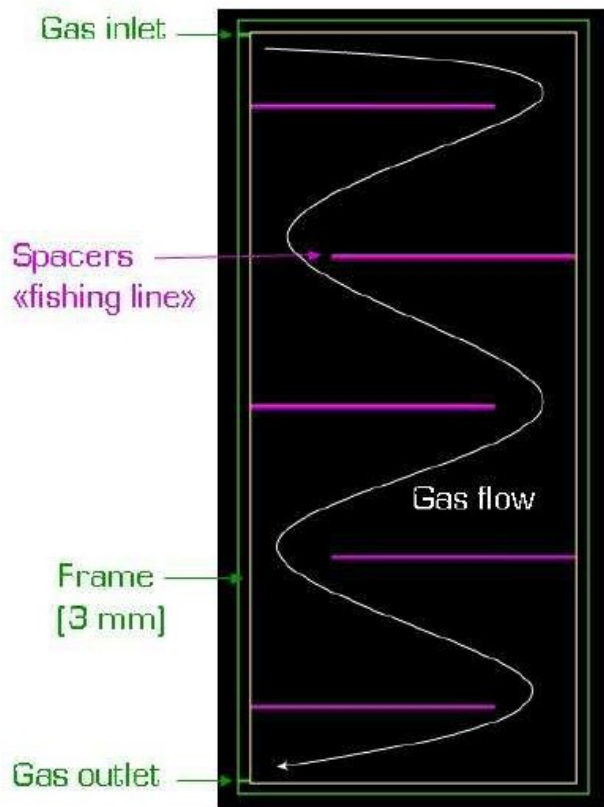
The default value of these 2 parameters have not yet been updated in the database.

The RPC.



For the EndCaps and EndCapRings, there is a mixed material used for the Mylar, the Graphite, the electronics, the PCB and the “free space”.

The RPC.



Upper view of the RPC as it is now.

In the current design, the spacer aren't any more “fishing lines” in nylon but ceramic balls. (One ball every 10 cm).

This would need to be changed in the simulation.

Final remark.

This status covers only the Mokka part of the simulation.

MOKKA simulates analogical RPC : the CalorimeterHits have the GEANT4 deposited energy in the RPC gas.

The digitization to get a Digital HCAL or a semi-Digital HCAL is done later in a Marlin Processor. Simulation of the RPC electronic answer to deposited energy is/will be done at this level.