

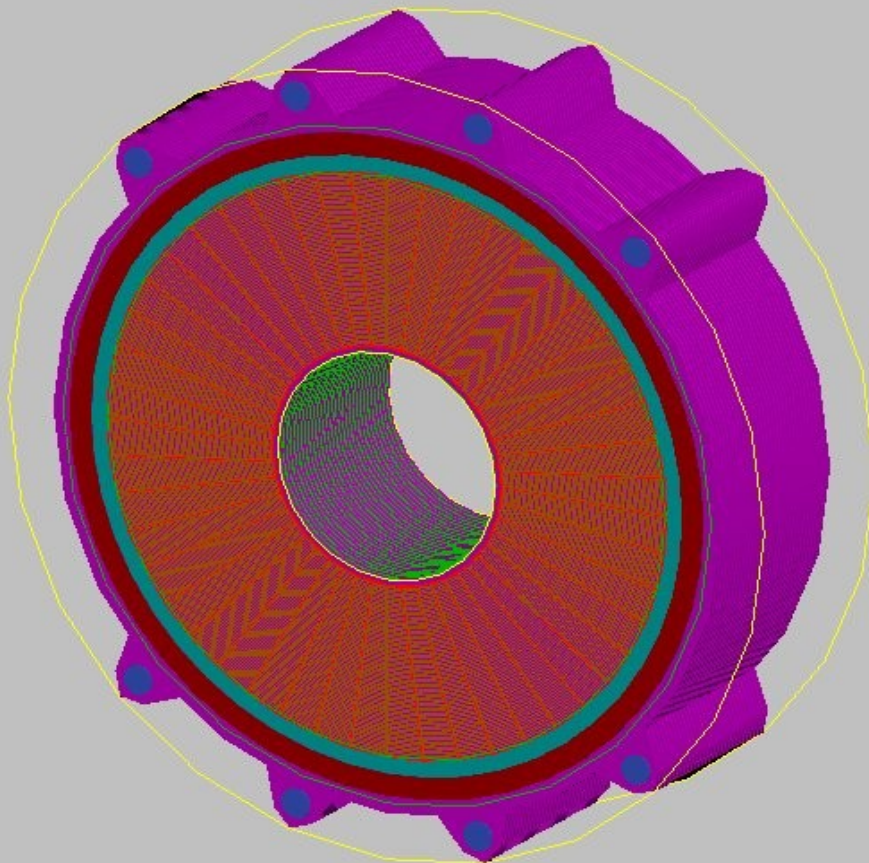
New LCAL Implementation in Mokka

B. Pawlik, J. Aguilar
FCAL Zeuthen 29-30 Jun 2009

- Geometric and physical parameters in accordance with those from EUDET-Memo-2008-13
- New features :
 - mechanical support structure
 - FE electronics
 - dead spaces between tiles
 - FE to sensor interconnection boards (PCB)
 - proper materials defined for PCB
 - enhanced flexibility for integration with ILD

Steering file parameters

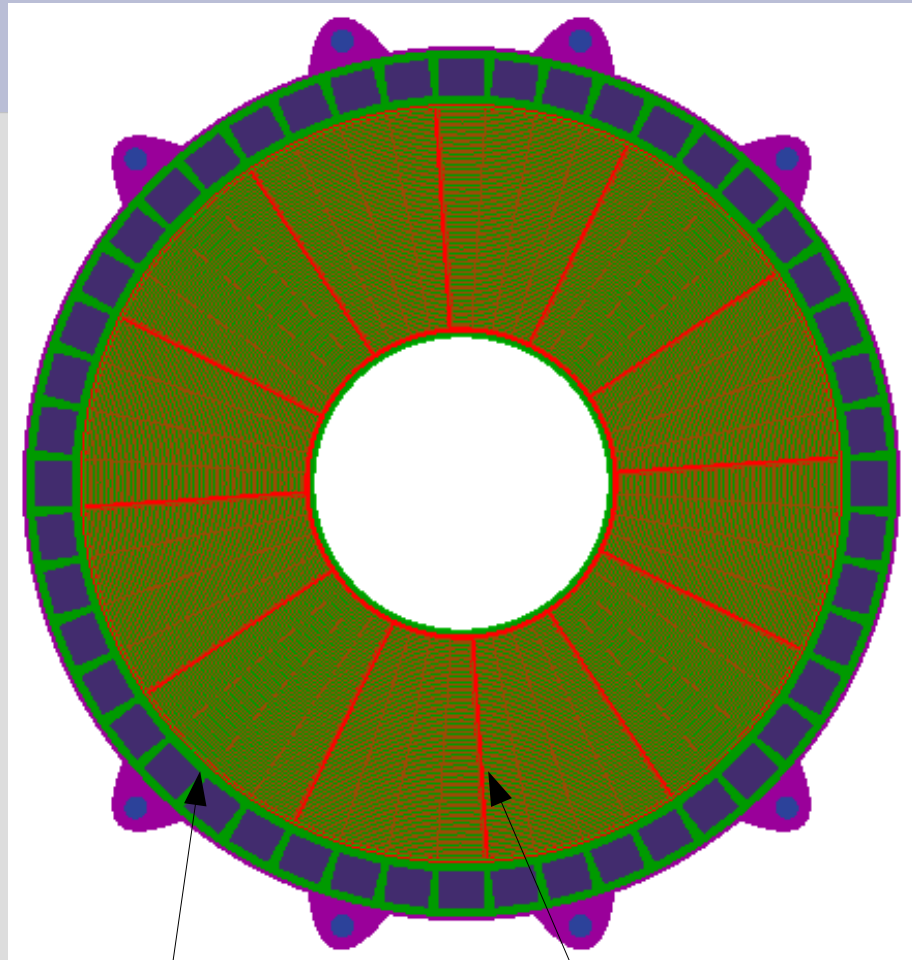
LCAL (RD) view



Parameter Name	Default Value	Units
Lcal_z_begin	2500.0	mm
Lcal_n_layers	30	
Lcal_n_tiles	12	
Lcal_n_sectors	48	
Lcal_ncells_theta	64	
Lcal_radius_max	250.0	mm
Lcal_radius_min	76.0	mm
Lcal_support_space	28.8	mm
Lcal_FE_space	26.0	mm
Lcal_absorber_rmax	222.0	mm
Lcal_sensor_rmax	195.2	mm
Lcal_sensor_rmin	80.0	mm
Lcal_PCBB_thickness	0.235	mm
Lcal_PCBF_thickness	0.160	mm
Lcal_PCBM_thickness	0.900	mm
Lcal_silicon_thickness	0.320	mm
Lcal_tungsten_thickness	3.500	mm
Lcal_FEchip_thickness	1.000	mm
Lcal_layer_air_gap	0.200	mm
Lcal_tiles_gap	1.200	mm

**Derived parameters : cell pitch = 1.762 mm
absorber gap = 0.915 mm**

Layer Front View (RD)



FE Chip

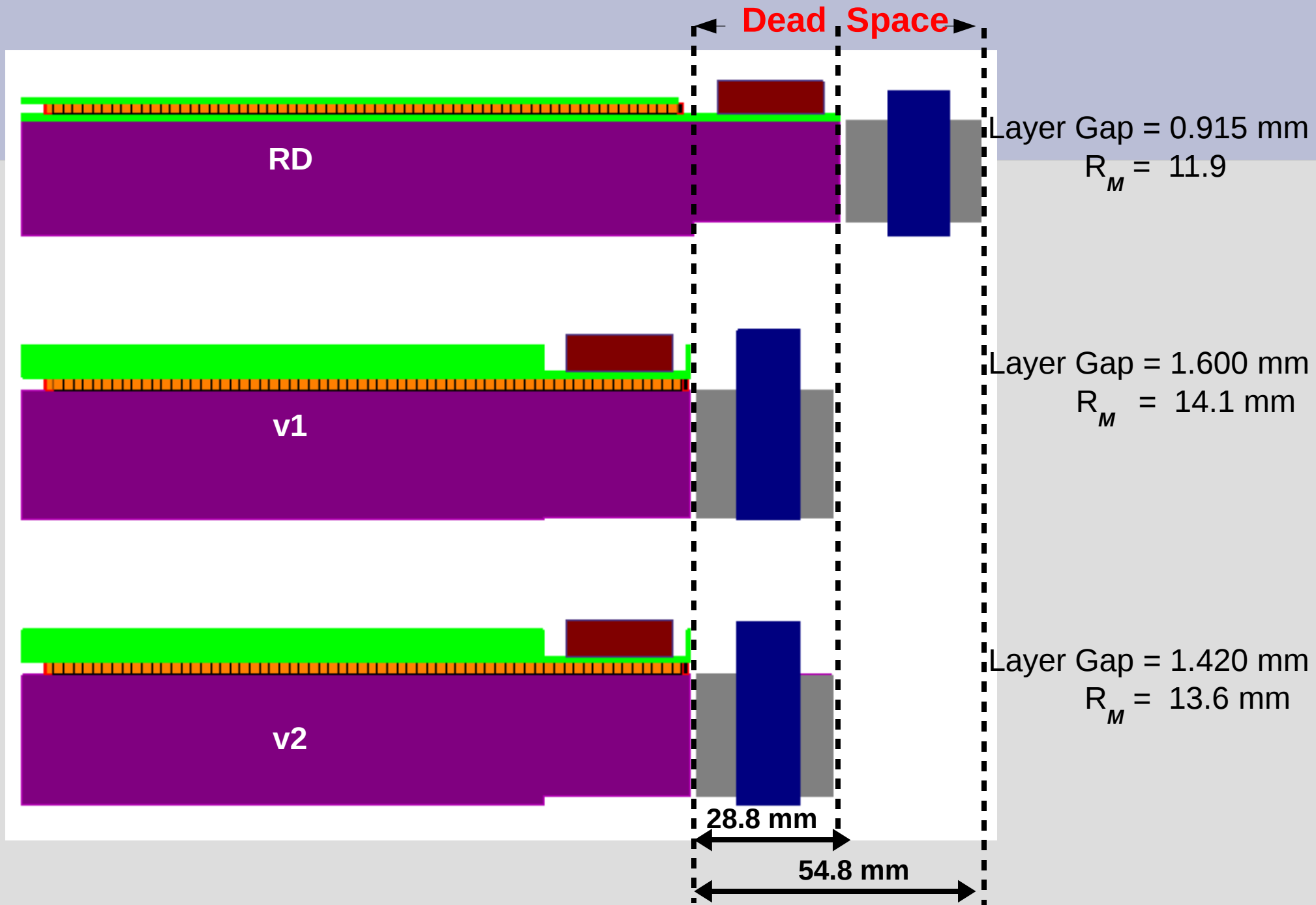
Inter tile gap

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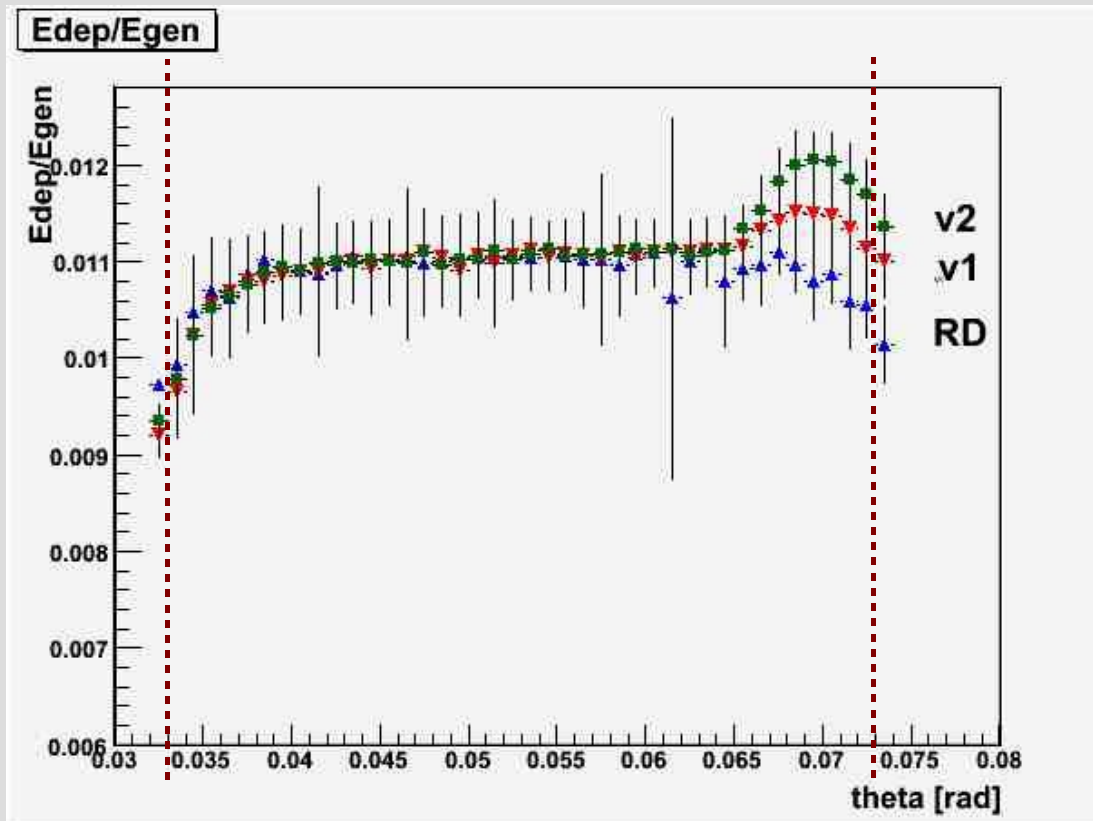
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|                                     |
|          LCAL parameters used in this run          |
|-----|-----|-----|-----|-----|-----|
|                                     |
|   Number of radial cells   :    64                |
|   Number of sectors       :    48                |
|   Number of planes        :    30                |
|                                     |
|   LCAL length              :   132.4             [mm] |
|   LCAL z begin            :  2502.6             [mm] |
|     first sensor z-pos    :  2503.1             [mm] |
|   LCAL inner radius       :    76.0             [mm] |
|     sensor inner radius   :    80.0             [mm] |
|   LCAL outer radius       :   224.5             [mm] |
|     sensor outer radius   :   195.2             [mm] |
|                                     |
|     cell radial pitch     :    1.759            [mm] |
|     sector width          :    7.5              [deg] |
|     sensor z distance    :    4.415            [mm] |
| gap between absorber plates :    0.915            [mm] |
|     air gap               :    0.200            [mm] |
|                                     |
|     F-E chip thickness   :    1.400            [mm] |
|     FANOUT front thickness :    0.160            [mm] |
|     back thickness       :    0.235            [mm] |
|     Si sensor thickness  :    0.320            [mm] |
|     Tungsten thickness   :    3.500            [mm] |
|     total plane thickness :    4.415            [mm] |
|     mass of the LCAL (1 arm) :  272.779          [kg] |
|-----|-----|-----|-----|-----|-----|
|                                     |
|          LCAL polar angle theta acceptance [rad]          |
|-----|-----|-----|-----|-----|-----|
|                                     |
|                                     |
|                                     |
|   theta_min |         geometrical         |         fiducial         | | | |
|---|---|---|---|---|---|
|   theta_min |         0.031             |         0.033             |
|   theta_max |         0.077             |         0.073             |
| FE-theta_min |         0.075             |                          |
| FE-theta_max |         0.089             |                          |
|-----|-----|-----|-----|-----|-----|

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ECAL – LCAL dead-gap issue



ECAL – LCAL dead-gap issue (cont.)



- Reducing dead-gap may cause
- Increased Moliere radius
 - Odd behavior of energy deposit as function of polar angle

END

- new, closer to reality , implementation of LCAL is ready – will be committed to Mokka repository and available for testing soon
- new LCAL geometry setup with FE electronics moved into sensitive volume causes increase of Moliere radius and extra inhomogeneity structure in sensitive volume