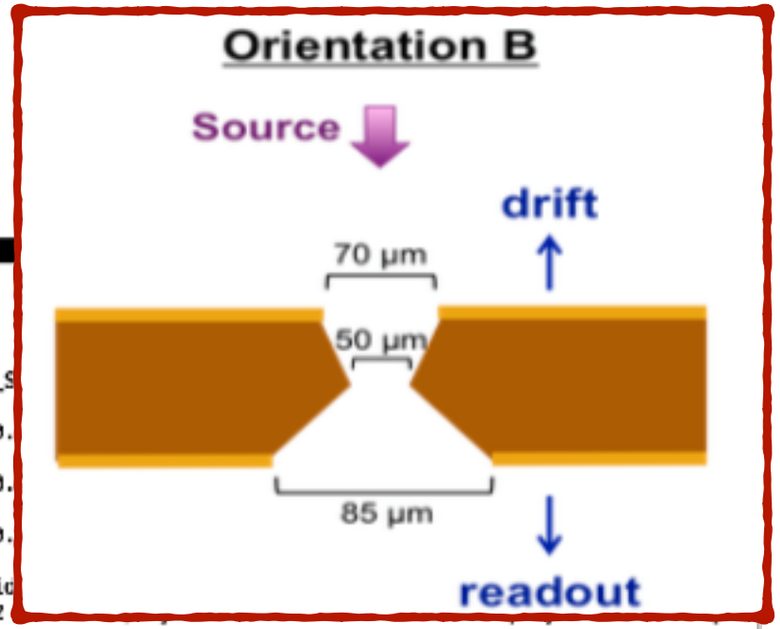
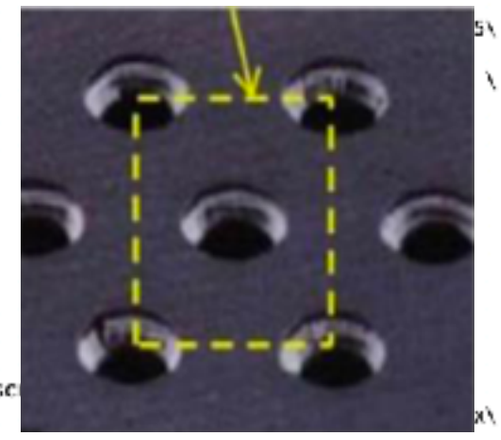
Geometry updates: holes implementation

- update cgem_model_5_default.txt




```
File Edit Options Buffers Tools Help
********** Layer **********
N_CgemLayer N_GemFoil_perLayer
      3          3
********** CgemLayer (mm)(Baseline:R_in_Cathode)********** Drift gap (mm) **
R_Layer L_Layer N_Sheet W_Sheet  A_Stero   W_Pitch_X W_Pitch_V W_Strip_X W_Strip_V N_Channel_Phi N_Channel_V Phi_start1  Phi_start2 dX_S
ntation
76.915   532      1       565.32  46.6877     0.660     0.660      0.580     0.130      856          1173      -3.14159265     0.       0.
    0
119.415  690      2       416.06  -31.0337    0.660     0.660      0.580     0.130     1260          2154      -3.14159265     0.       0.
    0
161.915  847      2       549.56  32.9244     0.660     0.660      0.580     0.130     1664          2790      -3.14159265     0.       0.
    0
********** Thickness of Cathode1-3 1.936[1.883+0.053](mm)2.140[2.085+0.055](mm)1.953[1.9+0.053](mm) ********** //[insid
N_materials     Cu1             Kapton1         Carbonf         Epoxy1          Honeycomb       Rohacell1       Epoxy2          Kapton2
on3         Cu2
        7       0.003           0.050           0               0.015           1.8             0               0.015           0.050           0               0               0               0   \
        0.003
        10      0               0.0125          0               0.015           0               1               0.015           0.0125          0.015                                                5\
0           0.005
        6       0               0               0.070           0.015           1.8             0               0.015           0.050           0                                                    \
        0.003
****************** Thickness of Other Gaps1-3 (mm)**********
Gap_T1                  Gap_T2          Gap_I
1.940                   1.940           1.940
1.940                   1.940           1.940
1.940                   1.940           1.940
********** GemFoil1-3 0.06 (mm)**********
N_materials             Cu1             Kapton          Cu2             R_i_hole        R_o1_hole       R_o2_hole       L_hole
     3                  0.005           0.05            0.005           0.025           0.035           0.0425          0.14
     3                  0.005           0.05            0.005           0.025           0.035           0.0425          0.14
     3                  0.005           0.05            0.005           0.025           0.035           0.0425          0.14
********** Anode1-3 4.165 [0.06+4.105](mm)/4.2375[0.06+4.1775](mm)/4.168 [0.06+4.108](mm)********** use strip desc
N_materials     Cu1             Kapton1         Cu2             Epoxy1          Kapton2         Epoxy2          Rohacell1       Carbonf1        Epoxy3
y4          Rohacell2       Carbonf2        Epoxy5          Cu3             Kapton4         Cu4     Strip_x_on      Strip_v_on
        14      0.005           0.050           0.005           0.025           0.025           0.015           0               0.070           0.015           3.8             0               0.01\
5           0               0.070           0.015           0.005           0.05            0       0               0
        14      0.005           0.050           0.005           0.025           0.025           0.015           2               0               0.015           0               0.0125          0.01\
5           2               0               0.015           0.005           0.05            0       0               0
        15      0.005           0.050           0.005           0.025           0.025           0.015           0               0.070           0.015           3.8             0               0.01\
5           0               0.070           0.015           0.005           0.050           0.003   0               0
********** cable density (g/cm3)**********
0.0270319
********** GEM/NDC separator (mm)**********
T_Separator_Rin   T_Separator_Rout   T_Separator_L
     182.6             183.2           1082
-UU-:----F1  cgem_model_5_default.txt   Top L9    CVS:1.2[CgemGeomSvc-00-00-34]  (Text)----------------------------------------------------------------------------------------------------
```



Geometry updates: holes implementation

- New flags on CgemGeomSvc related to the effective density:
  - in BesCgemConstruction.cxx: m_CreateHole(true)

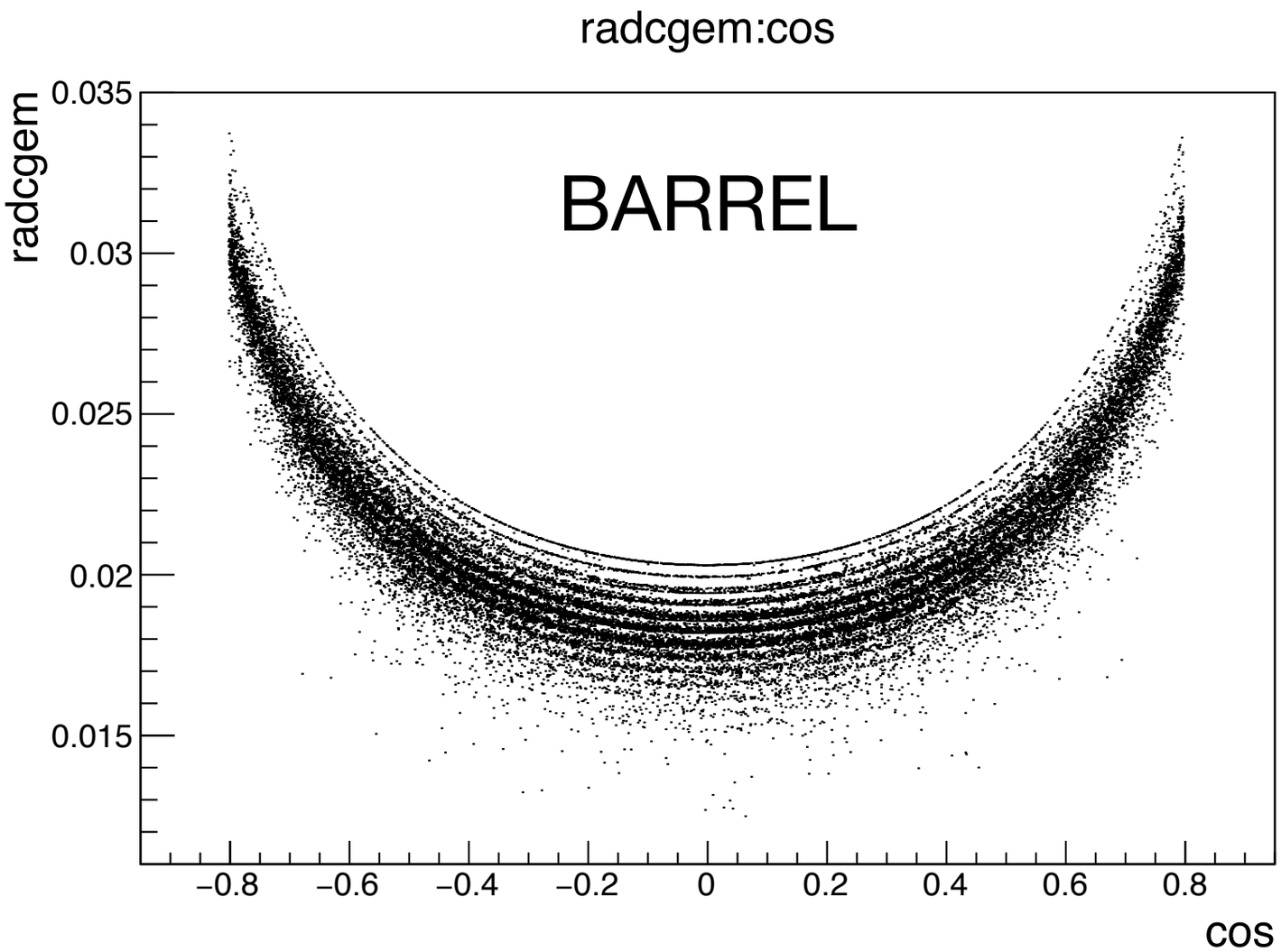
```
// Use effective density for CGEM holes and strips approximation
CgemGeomSvc.UseEffectiveDensityHoles = false;
CgemGeomSvc.UseEffectiveDensityStrips = false;
```

  - Update CgemGeoFoil.h:

```
double getInnerROfCgemFoilHole()          const {return          m_R_i_GemFoil_Hole ;}
double getOuterR1OfCgemFoilHole()         const {return          m_R_o1_GemFoil_Hole ;}
double getOuterR2OfCgemFoilHole()         const {return          m_R_o2_GemFoil_Hole ;}
double getLengthOfCgemFoilHole()   const {return          m_L_GemFoil_Hole;}
```

- Update CgemSim-01-00-33
  - BesCgemConstruction.cxx —> holes implementation
  - effective density

Radiation Length with holes implementation

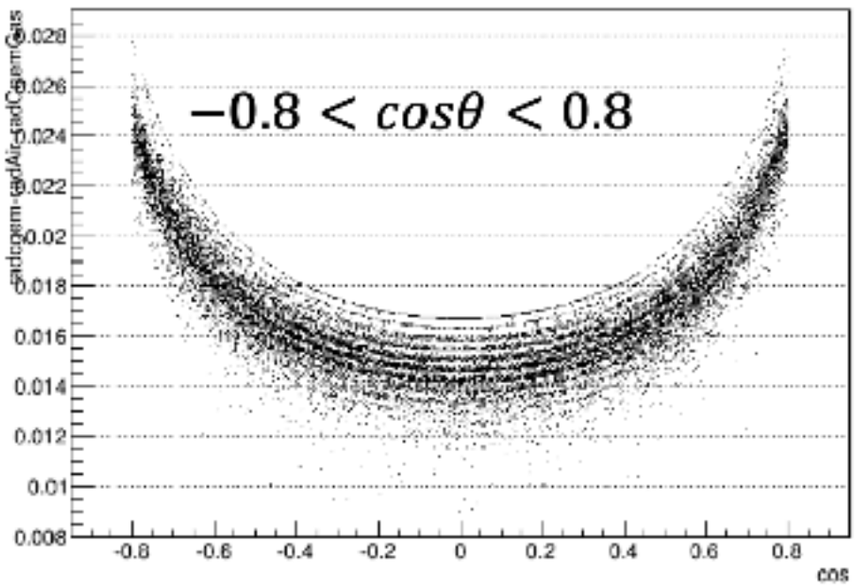


All contributions included (shield, gas and air)

Update X [holes]

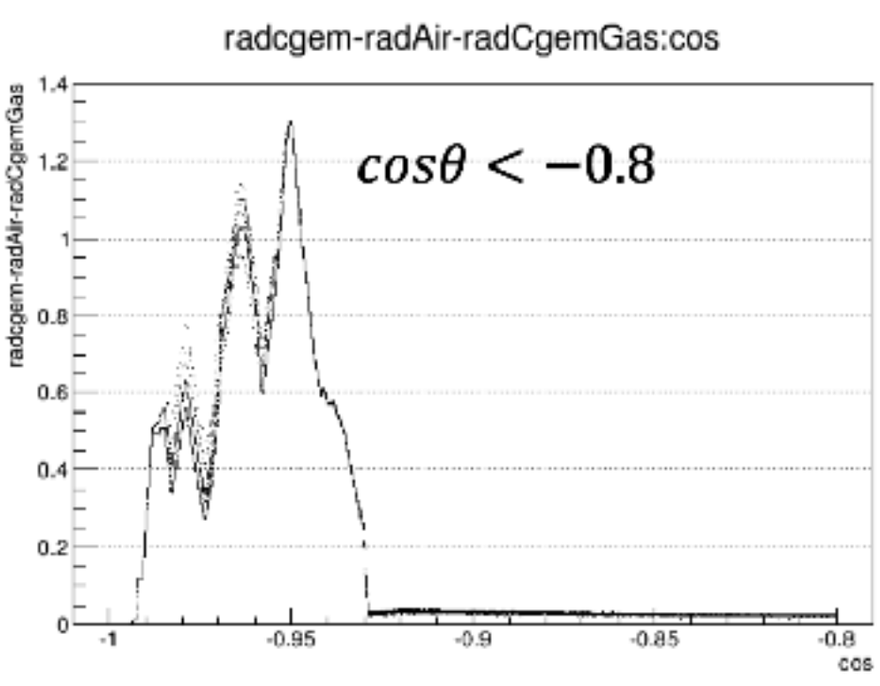
- ✓ CGEMBOSS 6.6.5.f
- ✓ Effective density: on
- ✓ Create Holes: on

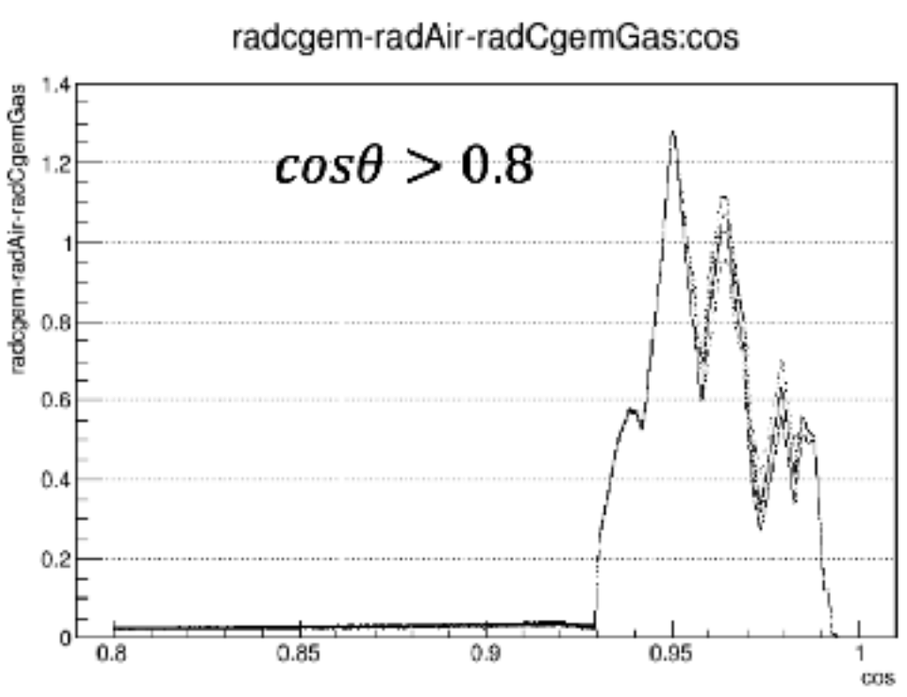
Barrel



CGEM

Endcap



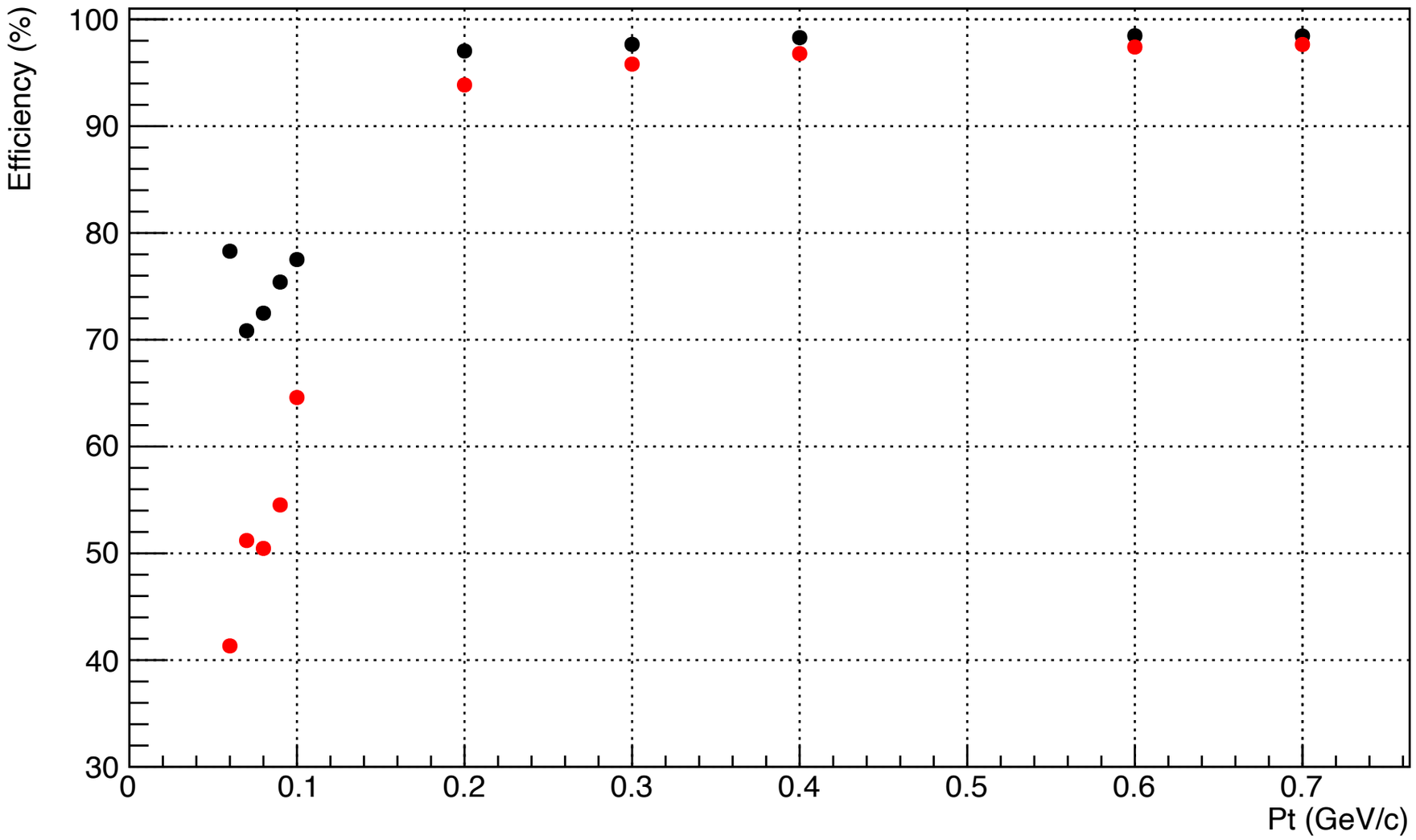


Geometry updates

To do:

- CgemGeomSvc-00-00-34 —> CgemGeomSvc-00-00-35
- CgemSim-01-00-33 —> CgemSim-01-00-34

Hough efficiency for good tracks



Single Pion simulation:

- NO CUTS
- Rxy<1 cm and Rz<10 cm