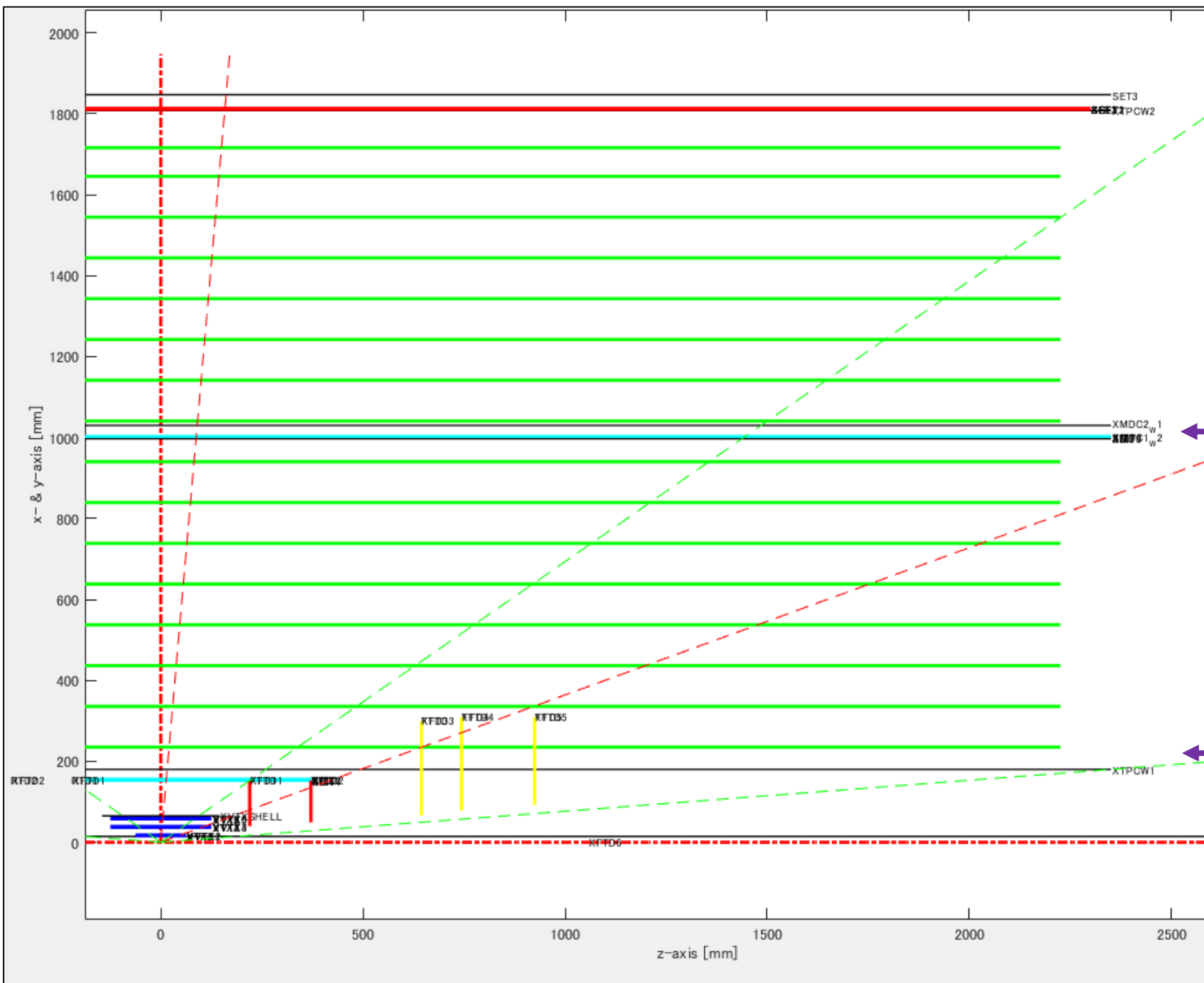


Status on SDT simulation

Ryuta

06/17/2020₁



Since I could not figure out how to set 2*"TPC" sections in the geometry file, thus, there is only one "TPC" which cover 2x"MDC"

2nd Inner tracker (SIT3/4) is set @ r=1000 mm

Lower boundary of MDC is set as r=180mm

```

LDT_Matlab.m x cepec-all_3.0T_MDC_config2.bgeom x LDT_display2D.m x geomconversion.m x LDT_r
20 % theta2, theta3: theta2<theta<theta3: only barrel region
21 % theta4: theta>theta4: only rear region
22 %
23 % Output: none
24 %
25 % GEOMETRY3D displays a sketch of the the chosen detector arrangement
26
27 %global fidlog whandle mhandle disfig hisfig unit Flags
28 global unit Flags SPR octave
29 warning off;
30 close(figure(1));
31 %close(figure(5));
32 if octave
33 [SPR,N,nameb,namef]=paramconversion;
34 else
35 [SPR,N]=paramconversion;
36 nameb=varargin{1};
37 namef=varargin{2};
38 end
39 %[VTX,SIT,TPC,SET,FM1,FM2,RM1,RM2]=LDT_ReadGeometry(nameb{1},namef{1});
40 [VTX,SIT,TPC,SET,FM1,FM2,RM1,RM2,nameb{1},namef{1}]=geomconversion(nameb{1},namef{1});
41 merging(VTX,SIT,TPC,SET,FM1,FM2,RM1,RM2);
42 [theta1,theta2,theta3,theta4]=limitangles; % calculates the limiting theta
43
44 drawnames=1; % set to 0 to avoid drawing of detector names
45 drawtheta=1; % set to 0 to avoid drawing of limiting angle's values
46 if Flags.ScaleDownTPC
47 drawwholeTPC=1; % set to 1 to have the program display all TPC layers
48 else
49 drawwholeTPC=0;
50 end
51
52 add1=2;
53 add2=40;

```

```

LDT_Matlab.m x cepec-all_3.0T_MDC_config2.bgeom x LDT_display2D.m x geom
636
637
638 % Converting values of barrel 3 (TPC)
639
640
641 TPC.Number=str2num(Valuesb{k});
642 if TPC.Number==0 % use empty arrays if no TPC
643 TPC.Radius=[];
644 TPC.Length1=[];
645 TPC.Length2=[];
646 TPC.EffRPhi=[];
647 TPC.Effz=[];
648 TPC.Xlen=[];
649 TPC.SigmaRPhi0=[];
650 TPC.SigmaRPhi1=[];
651 TPC.CdiffRPhi=[];
652 TPC.Sigmaz0=[];
653 TPC.Sigmaz1=[];
654 TPC.Cdiffz=[];
655 TPC.Name=[];
656 k=58;
657 else
658
659 if Flags.ScaleDownTPC
660 new=round(TPC.Number/5);
661 scaledown=TPC.Number/new;
662 TPC.Number=new;
663 end
664
665 for d=1:TPC.Number
666 name=['TPC-',num2str(d)];
667 TPC.Name{d}=name;
668 end
669
670 k=k+1;
671 % Radius

```

End wall of 1st “MDC”

Silicon Inner tracker (SIT3/4)

Inner wall of 2nd “MDC”

	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
1	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
2	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
3	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
4	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
5	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
6	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
7	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
8	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
9	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
10	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
11	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
12	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
13	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
14	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
15	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
16	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
17	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
18	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
19	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
20	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
21	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
22	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
23	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
24	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83
25	TPC-74	TPC-75	TPC-76	XMDC1_W2	SIT3	XSIT3	TPC-77	XSIT4	SIT4	TPC-78	TPC-79	XMDC2_W1	TPC-80	TPC-81	TPC-82	TPC-83

“Layer information”

Unnecessary wires

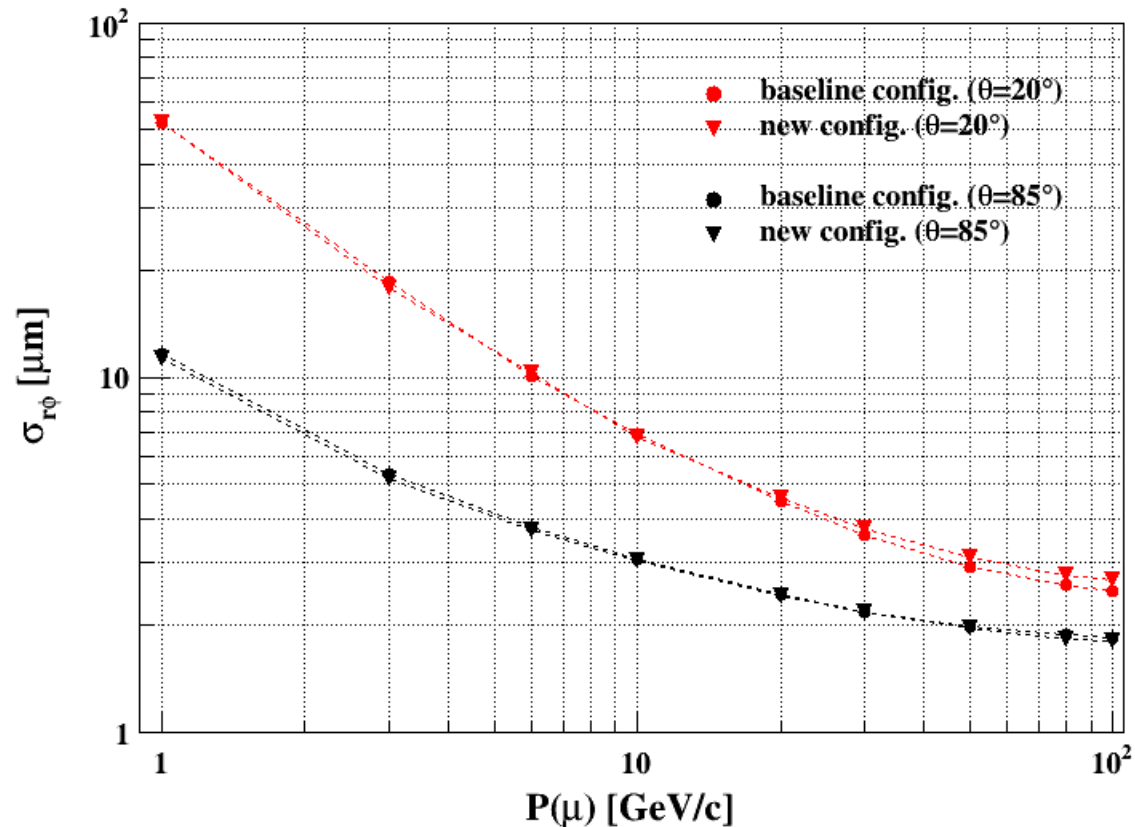
Geometry configuration file (barrel part) used in this run

```
LDT_Matlab.m x cepec-all_3.0T_MDC_config2.bgeom x LDT_display2D.m x geomconversion.m x LDT_run.m x +
22 22 Silicon Inner Tracker (SIT)
23 23
24 24 Number of layers      : 11
25 25 Description (optional) : |-----Inner tracker-----|TPC inner wall|
26 26 Names of the layers (opt.) : SIT1,      XSIT1,      XSIT2,      SIT2,      SIT3,      XSIT3,      XSIT4,      SIT4,      XTPCW1,      XMDC1_W2,      XMDC2_W1
27 27 Radii [mm]              : 152.9,      153.1,      154.4,      155.4,      999.9,      1000.1,      1001.4,      1002.4,      180,          997,          1030
28 28 Upper limit in z [mm]   : 371.3,      371.3,      371.3,      371.3,      2350,      2350,      2350,      2350,      2350,          2350,          2350
29 29 Lower limit in z [mm]   : -371.3,     -371.3,     -371.3,     -371.3,     -2350,     -2350,     -2350,     -2350,     -2350,          -2350,          -2350
30 30 Efficiency RPhi         : 0.99,      0,          0,          0,          0.99,      0,          0,          0,          0,          0,          0
31 31 Efficiency 2nd coord. (eg. z): 0,          0,          0,          0.99,      0,          0,          0,          0.99,      0,          0,          0
32 32 Stereo angle alpha [Rad] : 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180), 7*(pi/180)
33 33 Thickness [rad. lengths] : 0.00213,    0.00468,    0.00468,    0.00213,    0.00213,    0.00468,    0.00468,    0.00213,    0.0009367,    0.0009367,    0.0009367
34 34 error distribution      : 0
35 35 0 normal-sigma(RPhi) [1e-6m] : 7
36 36      sigma(z) [1e-6m] : 7
37 37 1 uniform-d(RPhi) [1e-6m] :
38 38      d(z) [1e-6m] :
39 39
40 40 Time Projection Chamber (TPC)
41 41 sigma^2=sigma0^2+sigma1^2*sin(beta)^2+Cdiff^2*6mm/h*sin(theta)*Ldrift[m]
42 42 Number of layers      : 148
43 43 Radii [mm]            : 235,1716
44 44 Upper limit in z [mm] : 2225
45 45 Lower limit in z [mm] : -2225
46 46 Efficiency RPhi       : 1
47 47 Efficiency z          : 1
48 48 Thickness [rad. lengths] : 0.00005194
49 49 sigma0(RPhi) [1e-6m] : 50
50 50 sigma1(RPhi) [1e-6m] : 900
51 51 Cdiff(RPhi) [1e-6m/sqrt(m)] : 25
52 52 sigma0(z) [1e-6m] : 400
53 53 sigma1(z) [1e-6m] : 0
54 54 Cdiff(z) [1e-6m/sqrt(m)] : 80
55 55
56 56 Silicon External Tracker (SET)
57 57
58 58 Number of layers      : 6
59 59 Description (optional) : |TPC outer wall|-----External Tracker-----|
60 60 Names of the layers (opt.) : XTPCW2,      SET1,      XSET1,      XSET2,      SET2,      SET3
61 61 Radii [mm]              : 1808,      1810.9,      1811.1,      1812.4,      1813.4,      1847.4
62 62 Upper limit in z [mm]   : 2350,      2300,      2300,      2300,      2300,      2350
63 63 Lower limit in z [mm]   : -2350,     -2300,     -2300,     -2300,     -2300,     -2350
64 64 Efficiency RPhi         : 0,          0.99,      0,          0,          0,          0
65 65 Efficiency 2nd coord. (eg. z): 0,          0,          0,          0,          0.99,      0
```

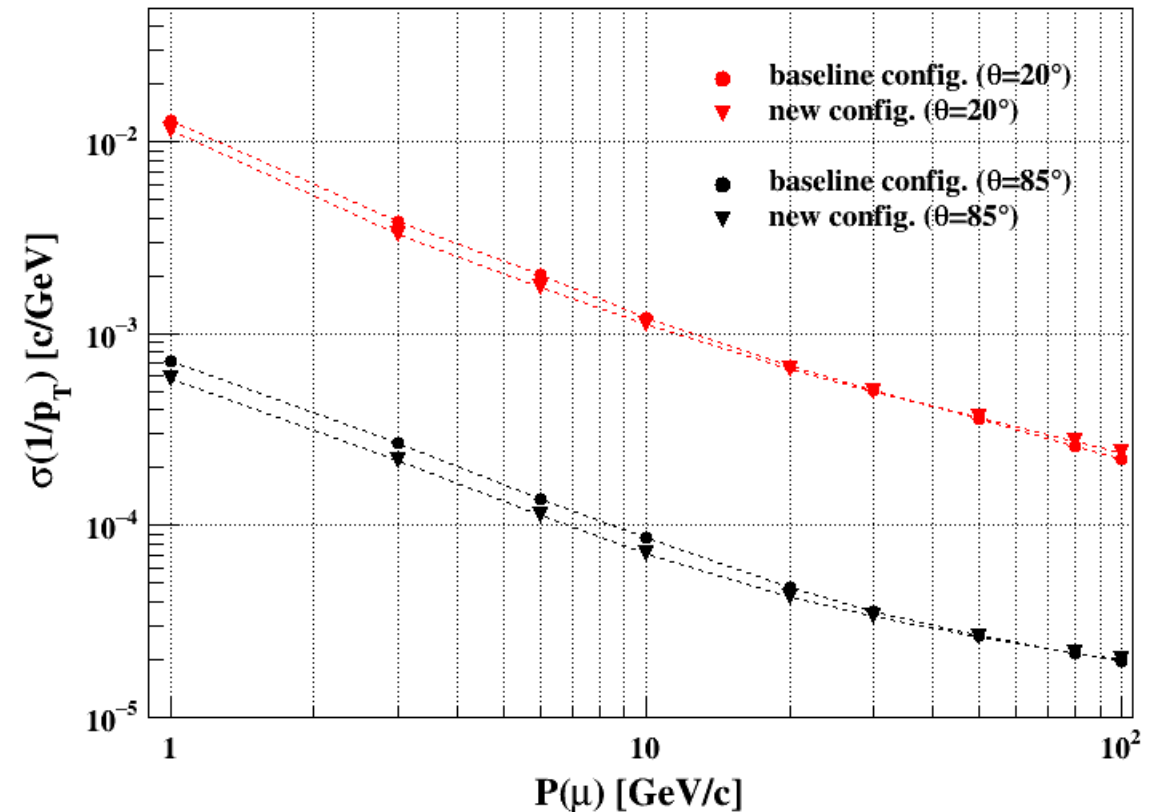
Comparison of resolutions

Changes: (from baseline config.) TPC → “MDC”

update : outer shell thickness of the “MDC” is set to 2mm (previous one was 0.2 mm)



Transverse impact parameter resolution



Momentum resolution

Backup

Comparison of resolutions

“MDC*2” configuration

