Status on LDT runs

Contents

- Follow up of the slide in last week

  -- material budget set in the LDT

Radiation length

```
23
24 Number of layers             :   12
25 Description (optional)       :   |-------------------------------------------------Ir
26 Names of the layers (opt.)   :   SIT1,        XSIT1,       XSIT2,       SIT2,
27 Radii [mm]                   :   152.9,       153.1,       154.4,       155.4,
28 Upper limit in z [mm]        :   371.0,       371.0,       371.0,       371.0,
29 Lower limit in z [mm]        :   -371.0,      -371.0,      -371.0,      -371.0,
30 Efficiency RPhi              :   0.99,        0,           0,           0,
31 Efficiency 2nd coord. (eg. z):   0,           0,           0,           0.99,
32 Stereo angle alpha [Rad]     :   7*(pi/180),  7*(pi/180),  7*(pi/180),  7*(pi/180),
33 Thickness [rad. lengths]     :   0.00213,     0.00468,     0.00468,     0.00213,
34 error distribution           :   0
35 0 normal-sigma(RPhi) [1e-6m] :   7
36          sigma(z)    [1e-6m] :   7
37 1 uniform-d(RPhi) [1e-6m]    :
38           d(z)    [1e-6m]    :   |
```

- Silicon sensor (SIT)

  -- 200μm thickness

  -- radiation length : 9.370cm
  (https://pdg.lbl.gov/2019/AtomicNuclearProperties/HTML/silicon_Si.html)

  material budget : X = 200μm/9.370cm = 0.0021344

  -- radiation length for the support part is set at 0.00468

  - One double layer consists of 2*(sensor+support)

  ⇒ Total radiation length for SIT1/2 + SIT3/4 + SET1/2 :

  3 * 2*(0.00213 + 0.00468) = 0.04086 (~ 4%)

Radiation length

```
----------|TPC inner wall|
    XMDC1_W1,     XMDC1_W2,     XMDC2_W1,     XMDC2_W2,
    237,          887,          1066,         1716,
    2350,         2350,         2350,         2350,
    -2350,        -2350,        -2350,        -2350,
    0,            0,            0,            0,
    0,            0,            0,            0,
),  7*(pi/180),   7*(pi/180),   7*(pi/180),   7*(pi/180),
    0.0009367,    0.009367,     0.0009367,    0.009367,
```

- DCH wall

  -- 200μm thickness

  -- radiation length : 21.35cm
  (https://pdg.lbl.gov/2019/AtomicNuclearProperties/HTML/carbon_amorphous_C.html)

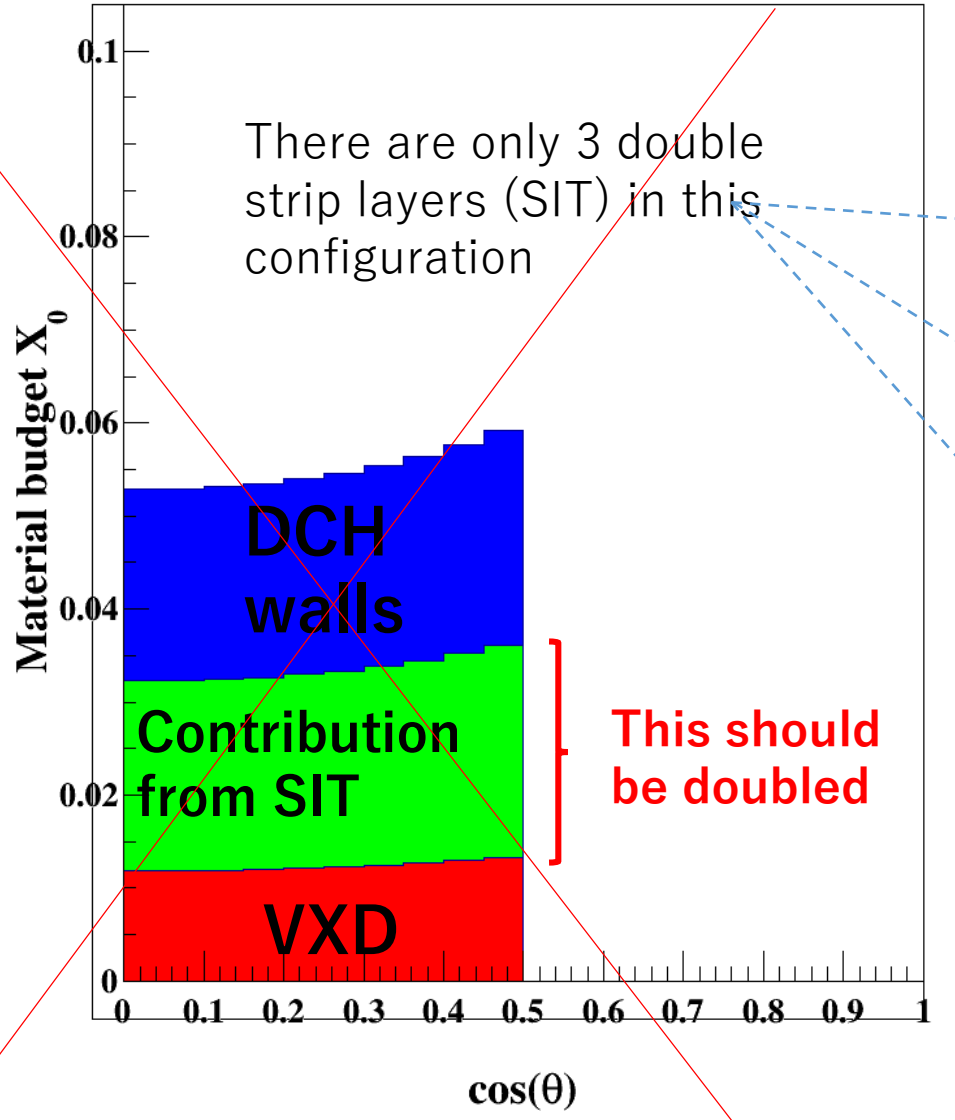
  material budget (front wall): X = 0.2mm/21.35cm = 0.0009367

  (rear wall): X = 2.0mm/21.35cm = 0.009367

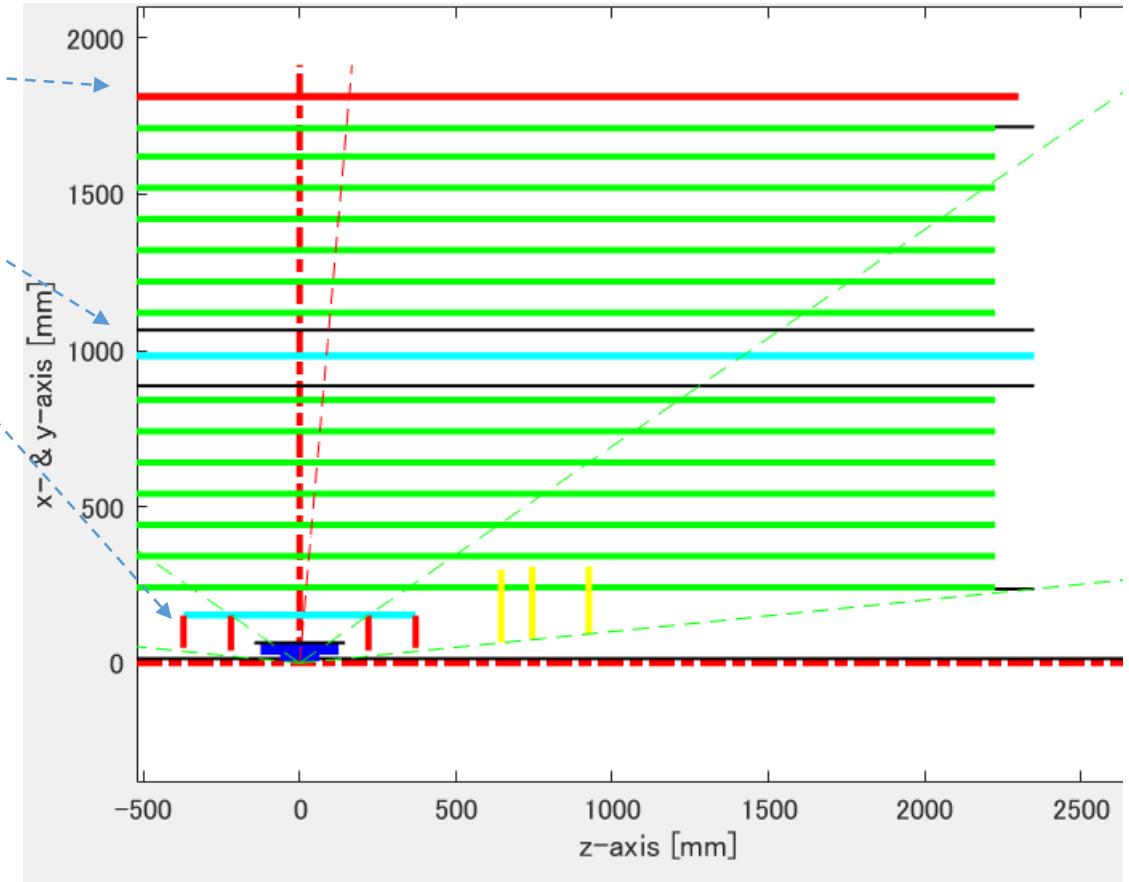
Total radiation length if 2 MDCs are installed:

2*(0.0009367 + 0.009367) = 0.02061 (~ 2%)

Material budget in LDT simulation



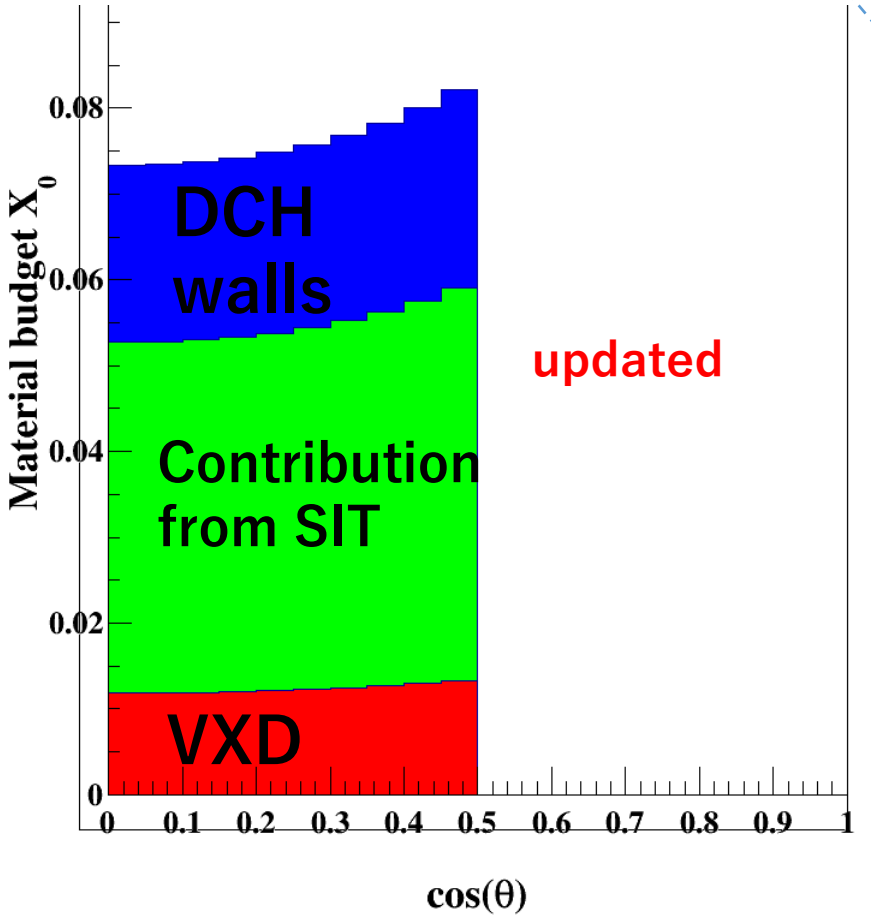
SDT config. with 2 DCHs



Note that this happens only for this figure. LDT run itself was configured as intended

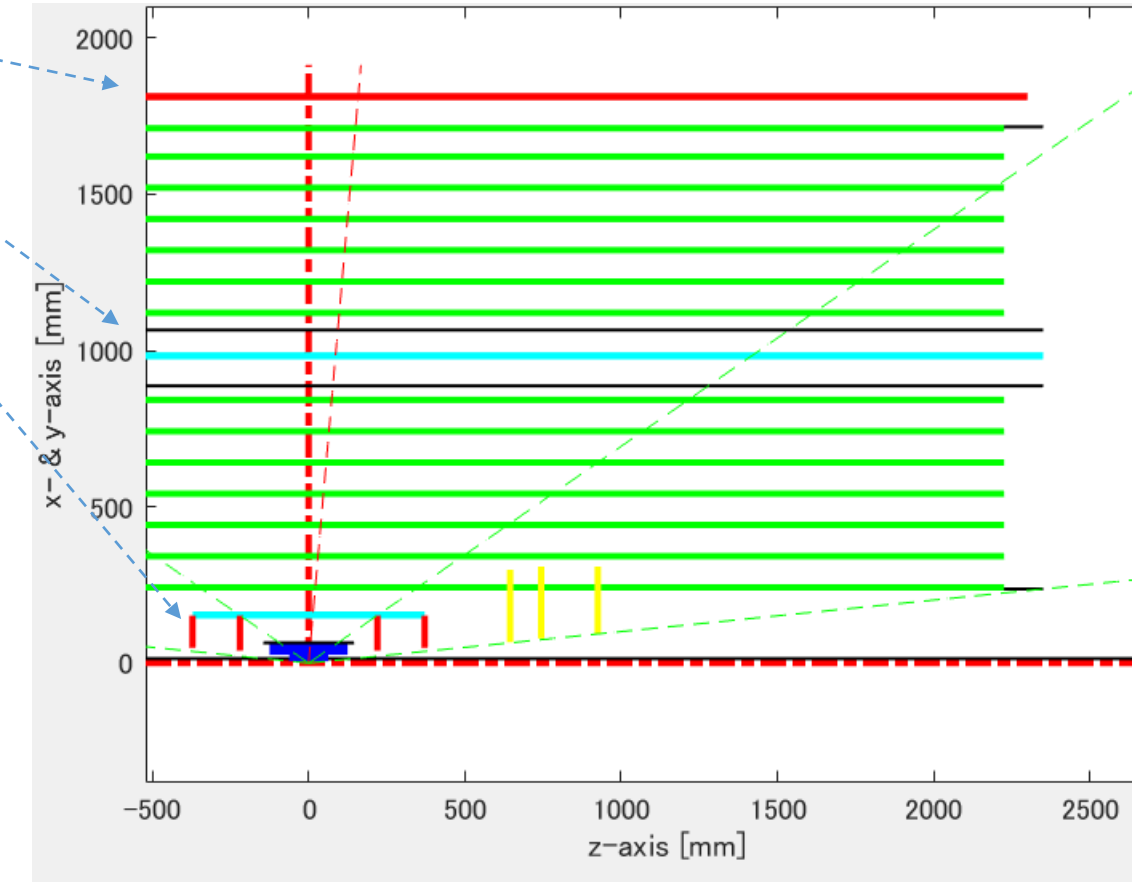
Material budget in LDT simulation

There are only 3 double strip layers (SIT) in this configuration



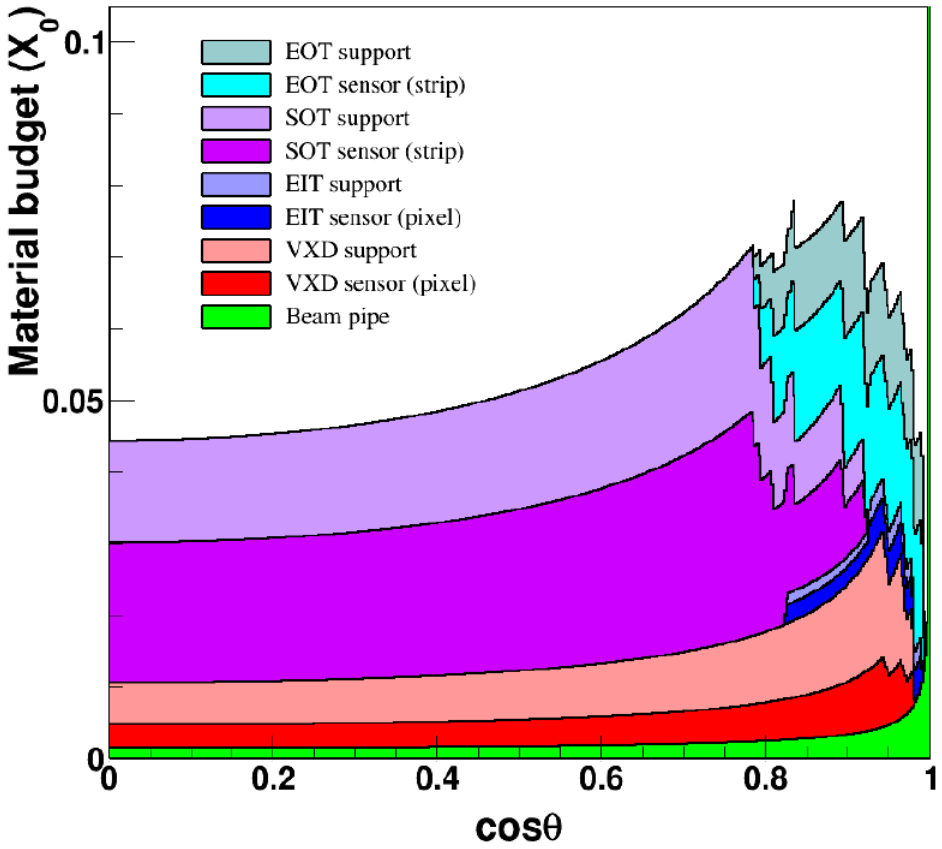
updated

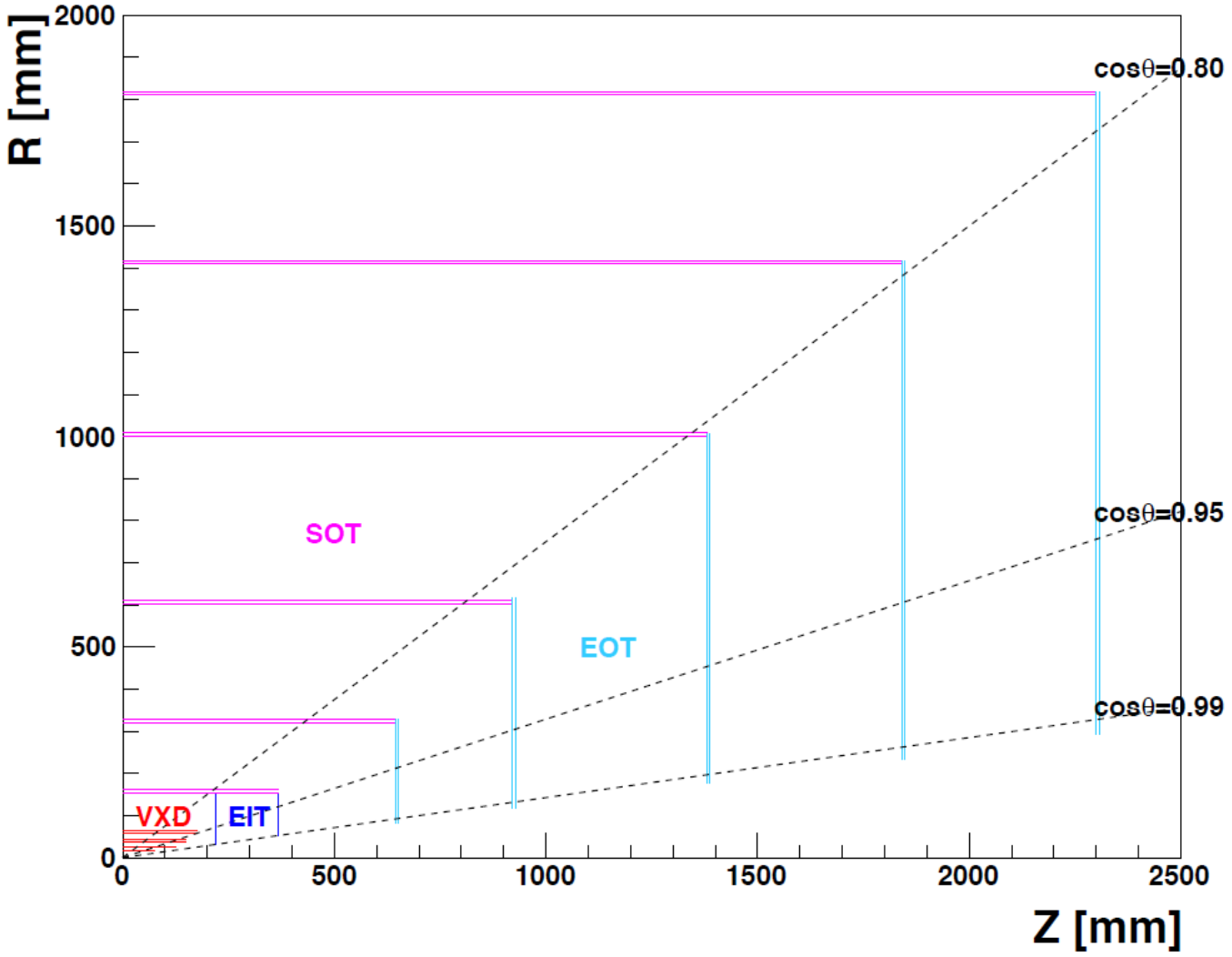
SDT config. with 2 DCHs



Material budget at FST

FST plans to have 6 double strip layers





Comments

・ How much can we assume reduction of total Material budget ?

-- thinner DCH wall ?

-- half material for SIT ?

・ Position of the SIT (material), for example, very middle of MDCs/surrounding MDCs, ,, looks like to affect the performance at certain level . (not studied well)