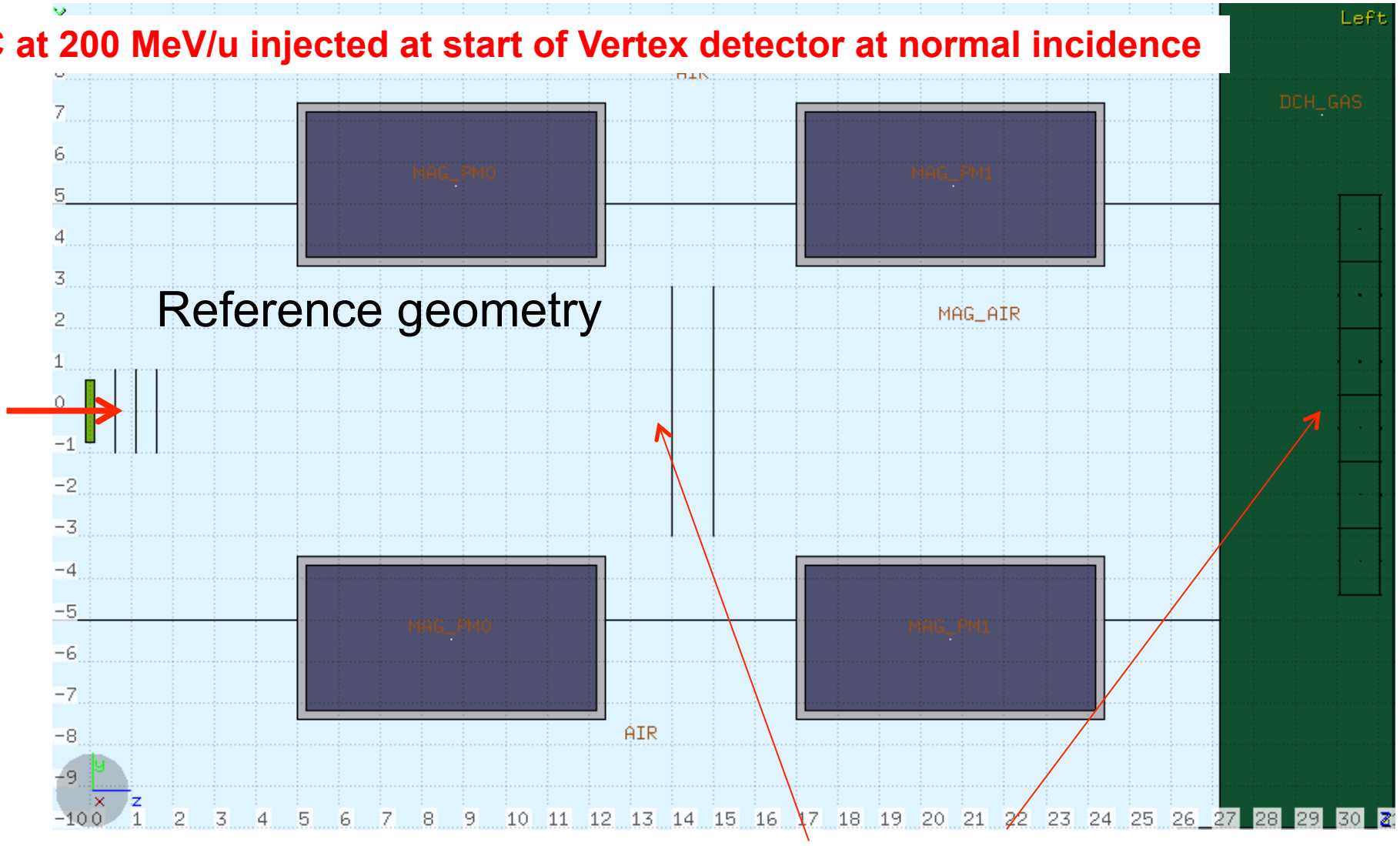
Evaluation of MS in the tracking system

Some changes in the baseline design

G.B.

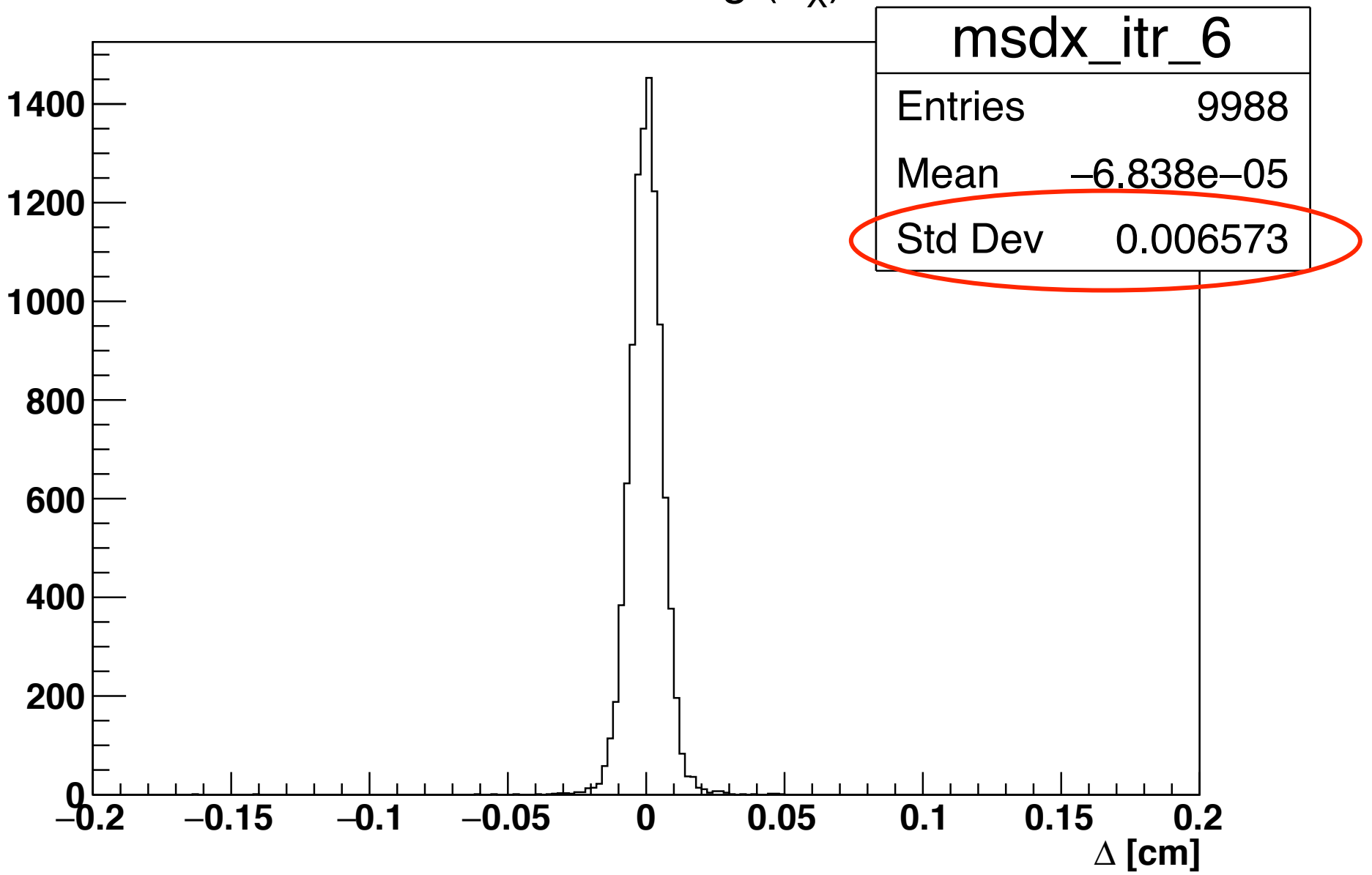
Evaluation of multiple scattering in the tracking system

^{12}C at 200 MeV/u injected at start of Vertex detector at normal incidence

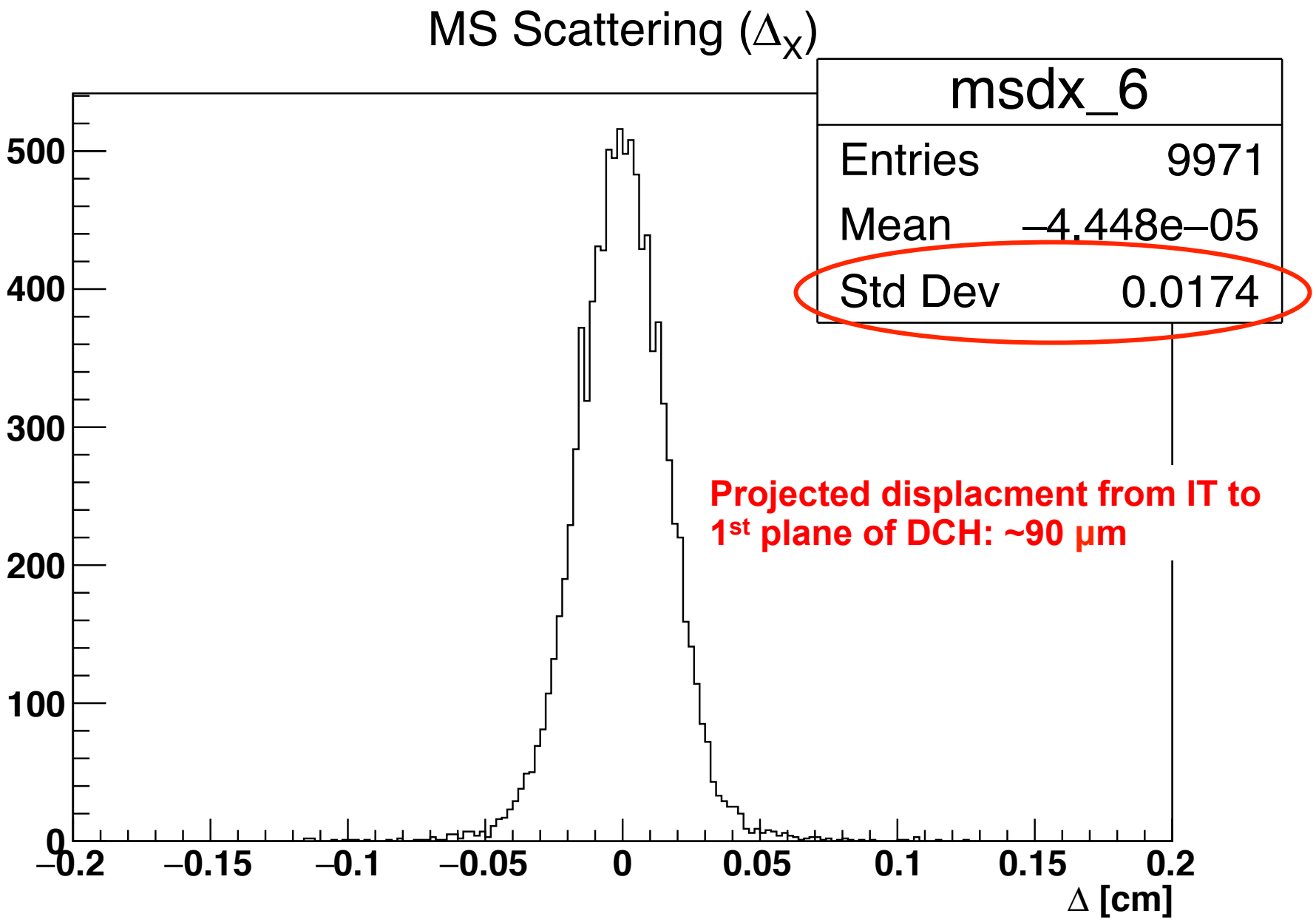


Projected displacment measuured at IT and 1st plane of DCH

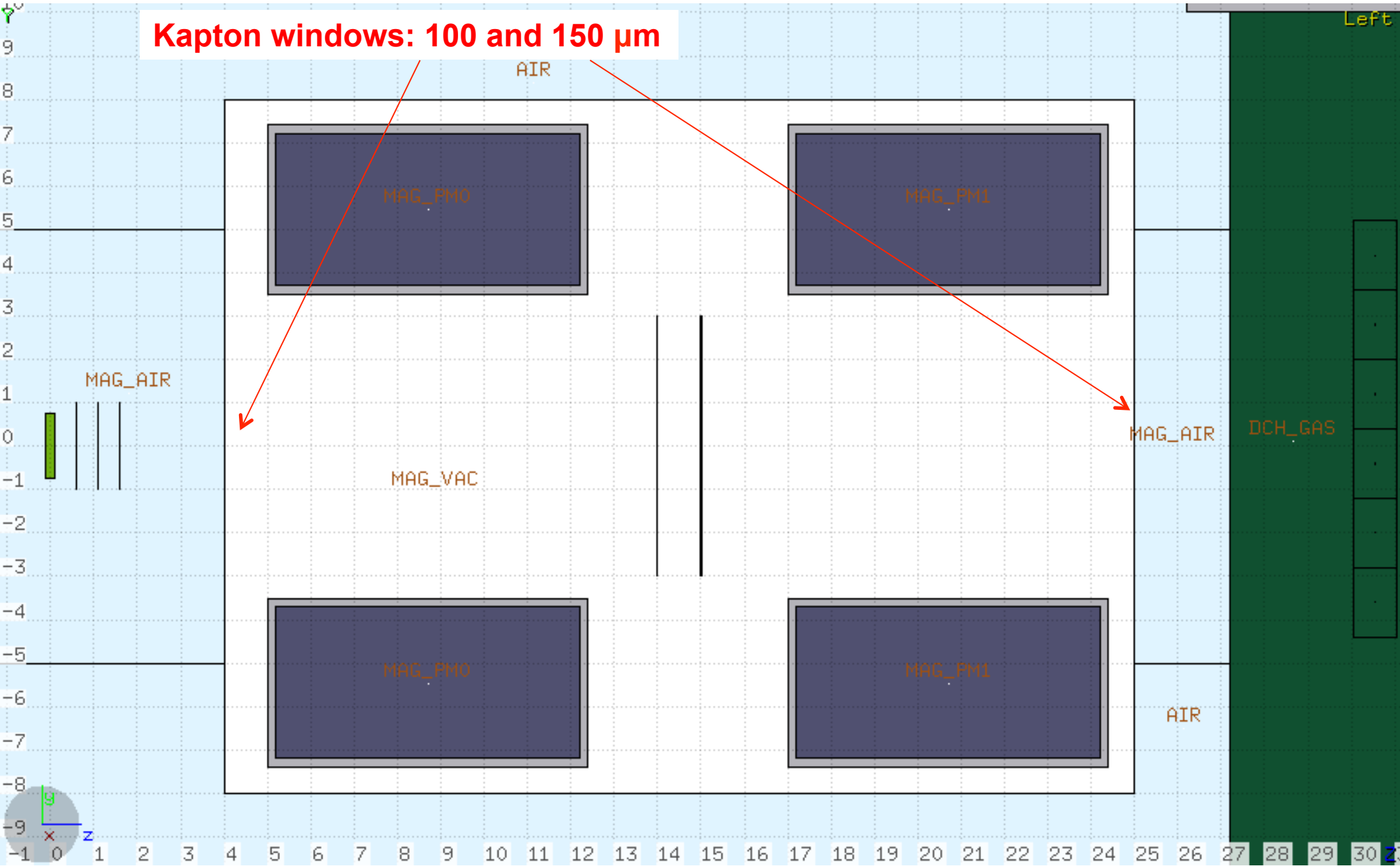
Scattering at IT



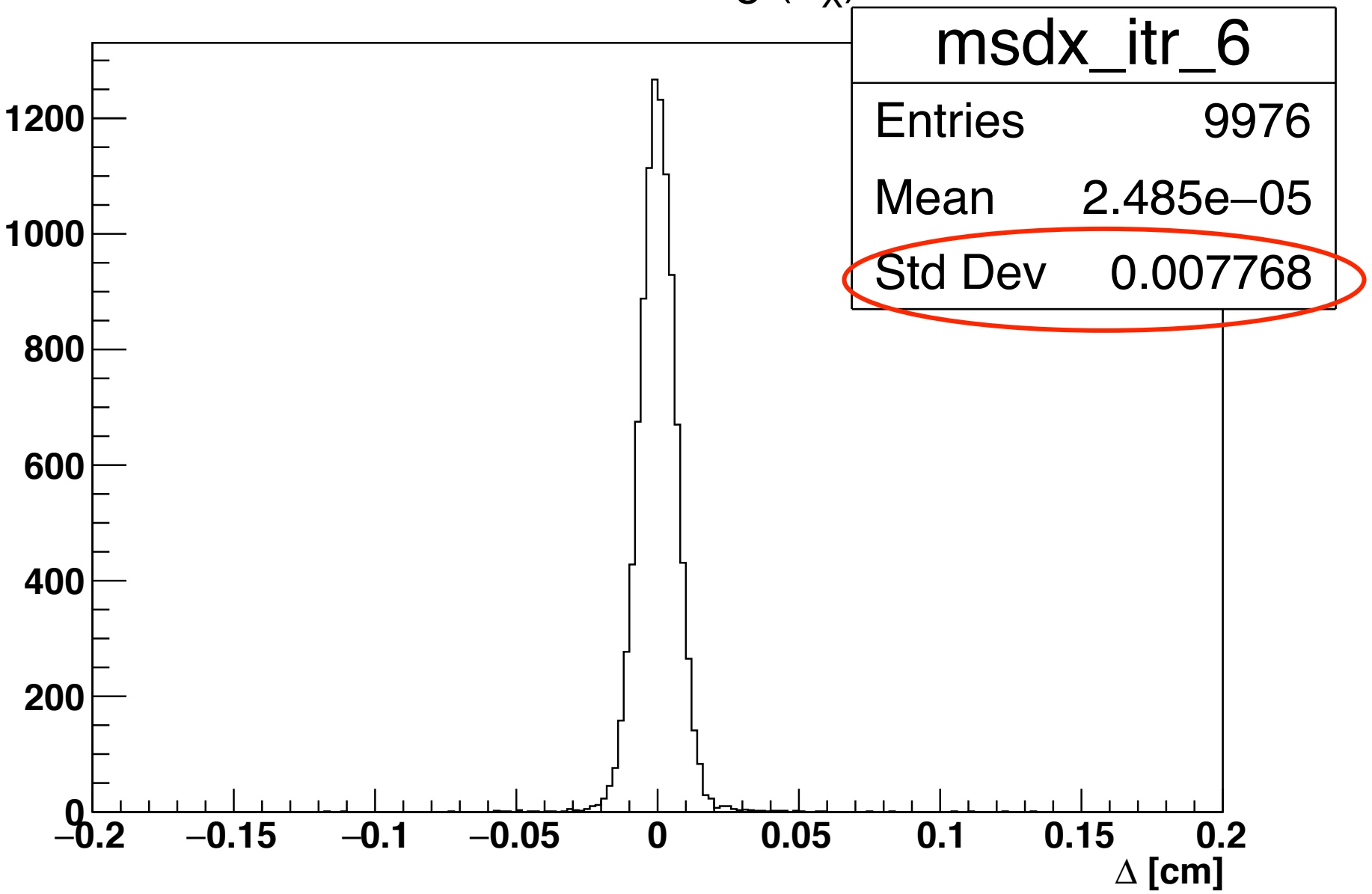
Scattering at 1st plane of DCH



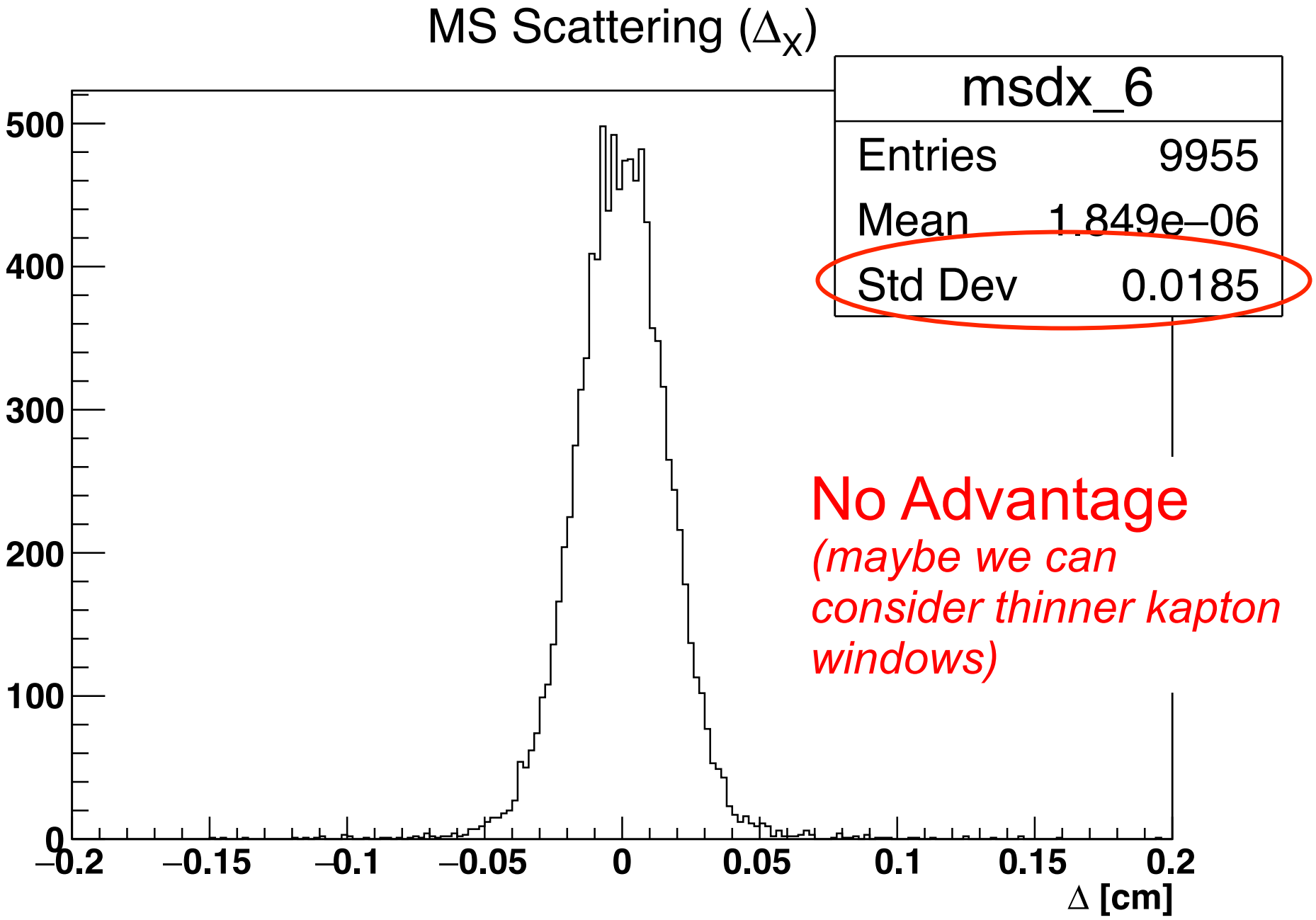
Geometry with vacuum chamber



Scattering at IT



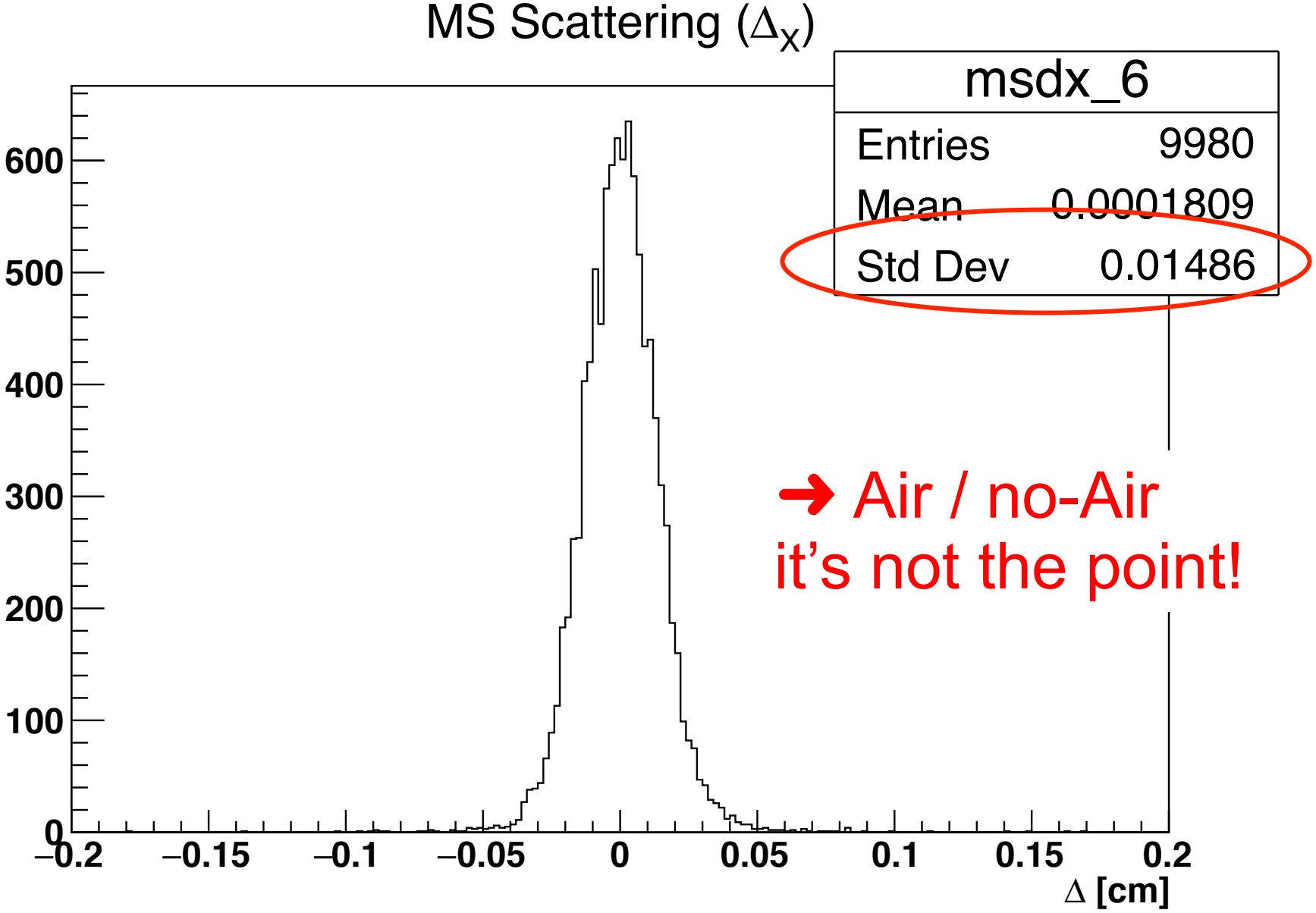
Scattering at 1st plane of DCH



No Advantage

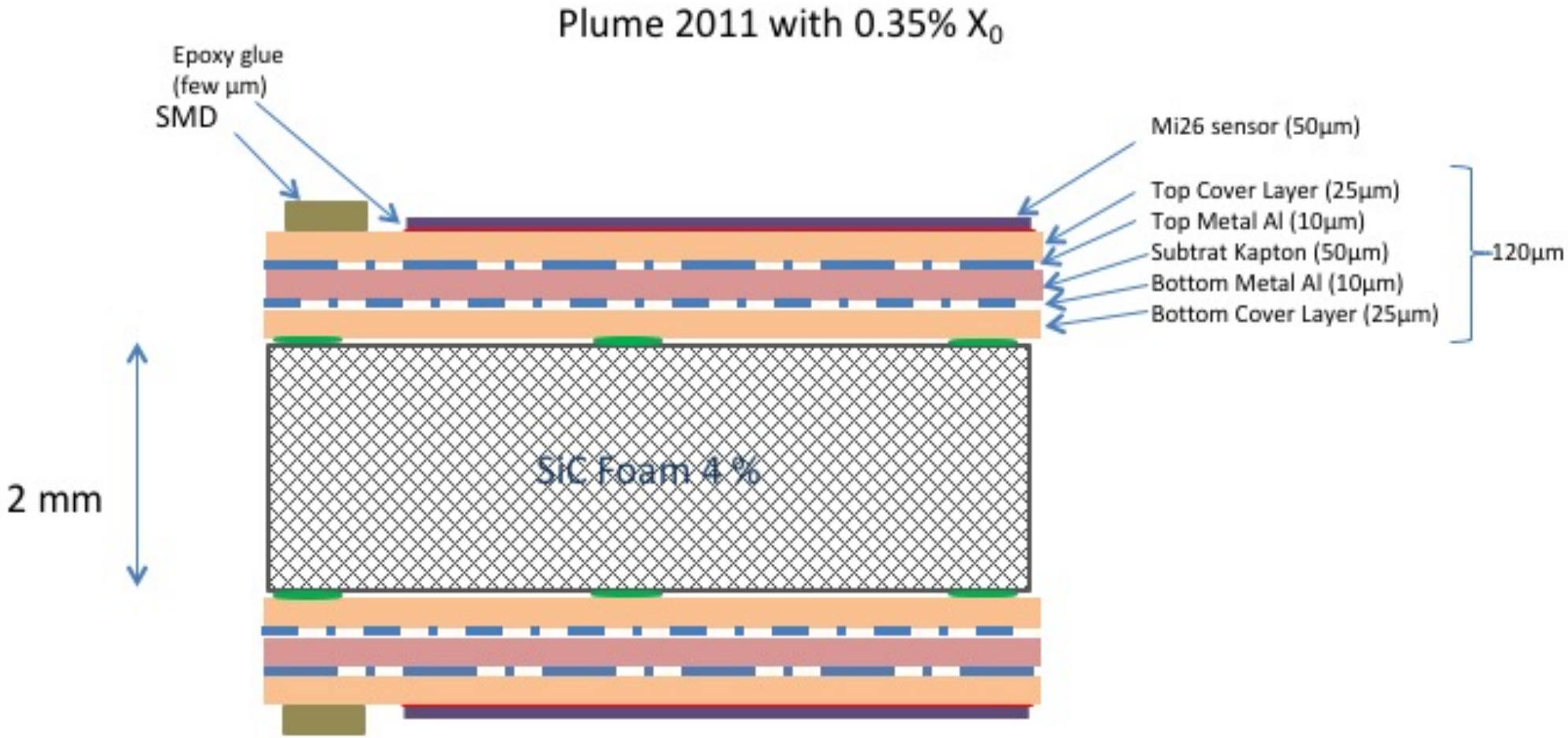
(maybe we can consider thinner kapton windows)

Scattering at 1st plane of DCH all detectors in vacuum



➜ Air / no-Air
it's not the point!

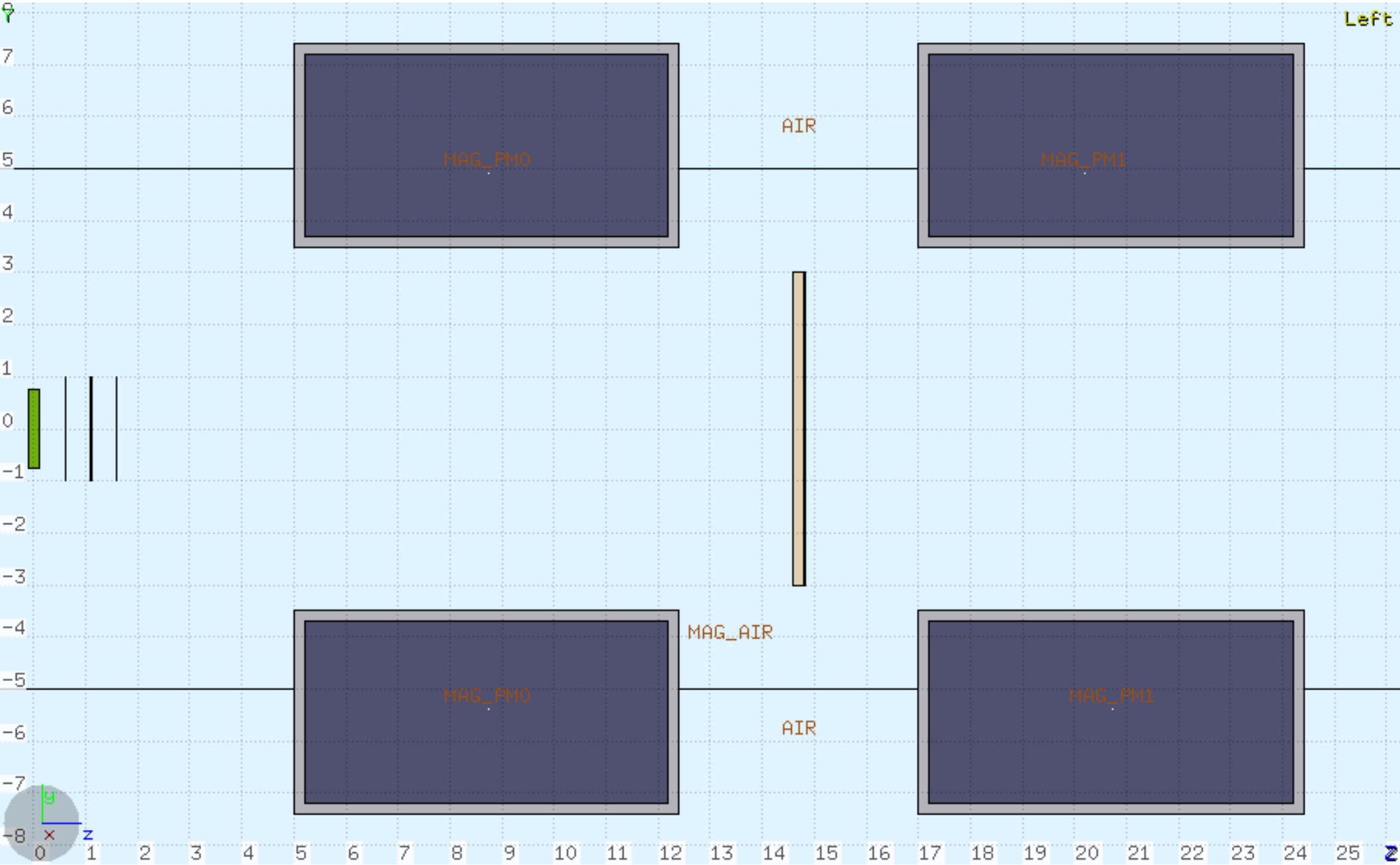
Actually the geometry of IT has more material to be considered



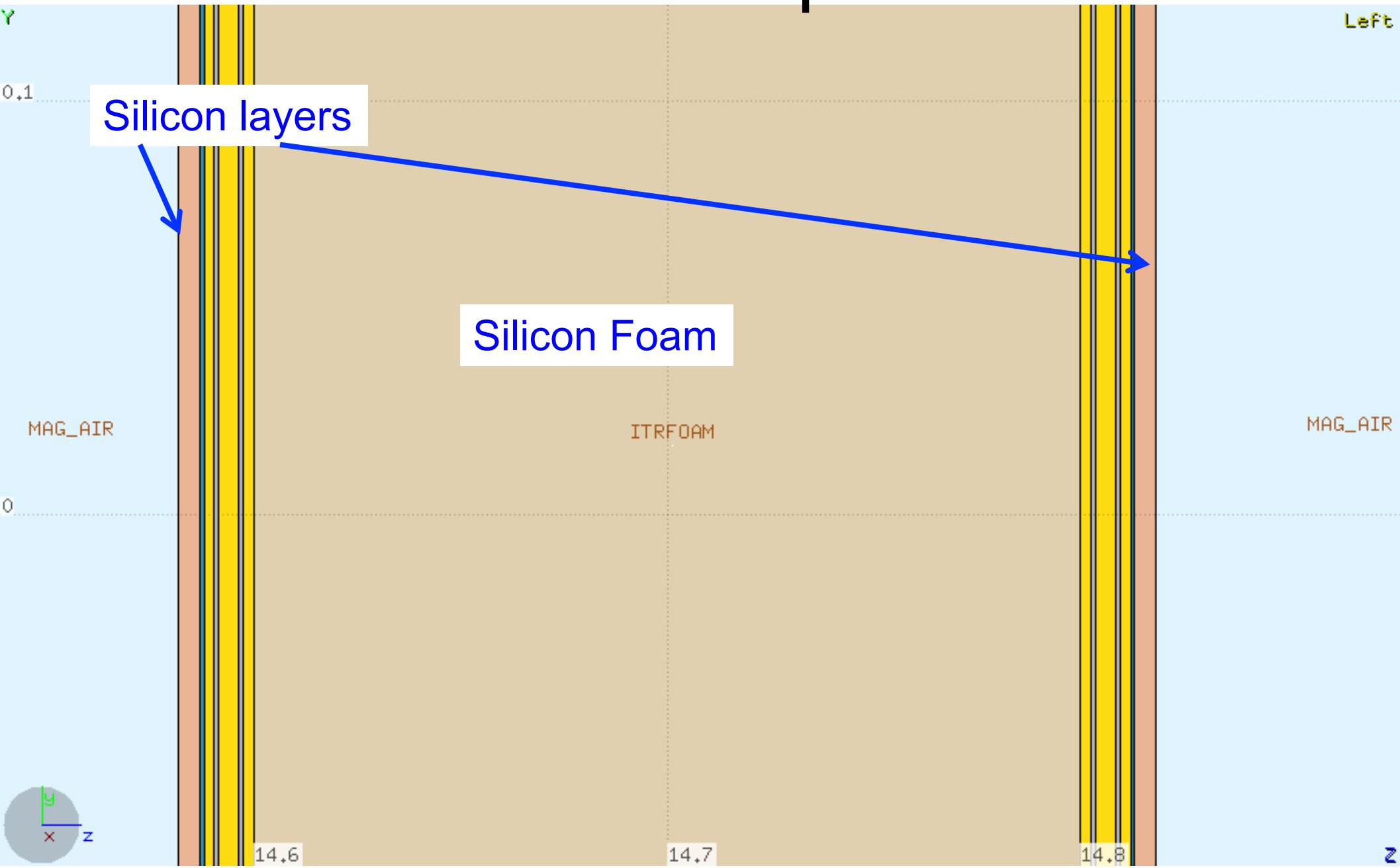
Stratigrafy of the MIMOSA 28 board (double Si layer)

A first idea of the actual design of IT

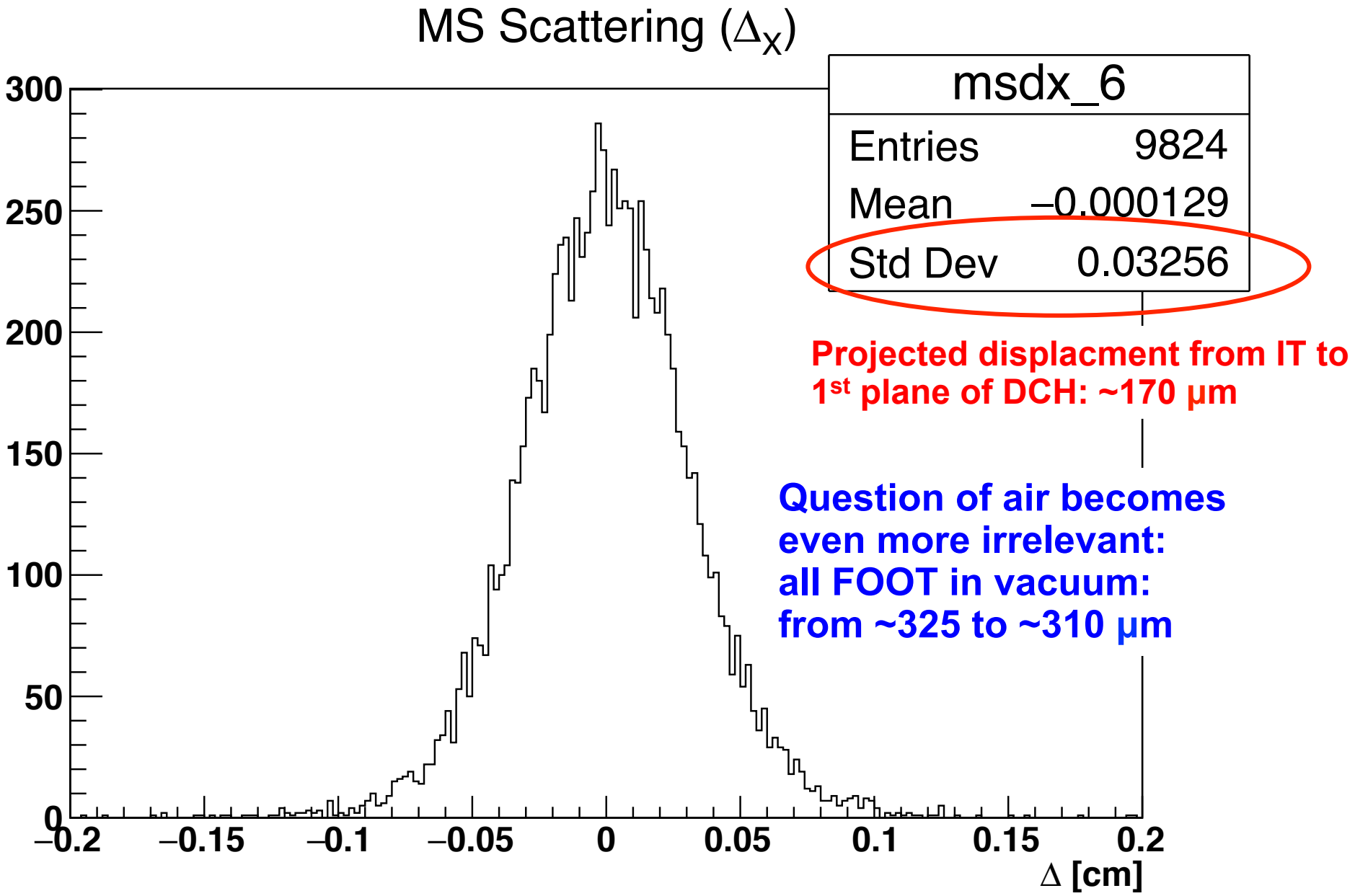
Approximante implementation in simulation



Blow-up


Y
Left
0.1
Silicon layers
Silicon Foam
MAG_AIR
ITRFOAM
MAG_AIR
0
14.6
14.7
14.8
Z

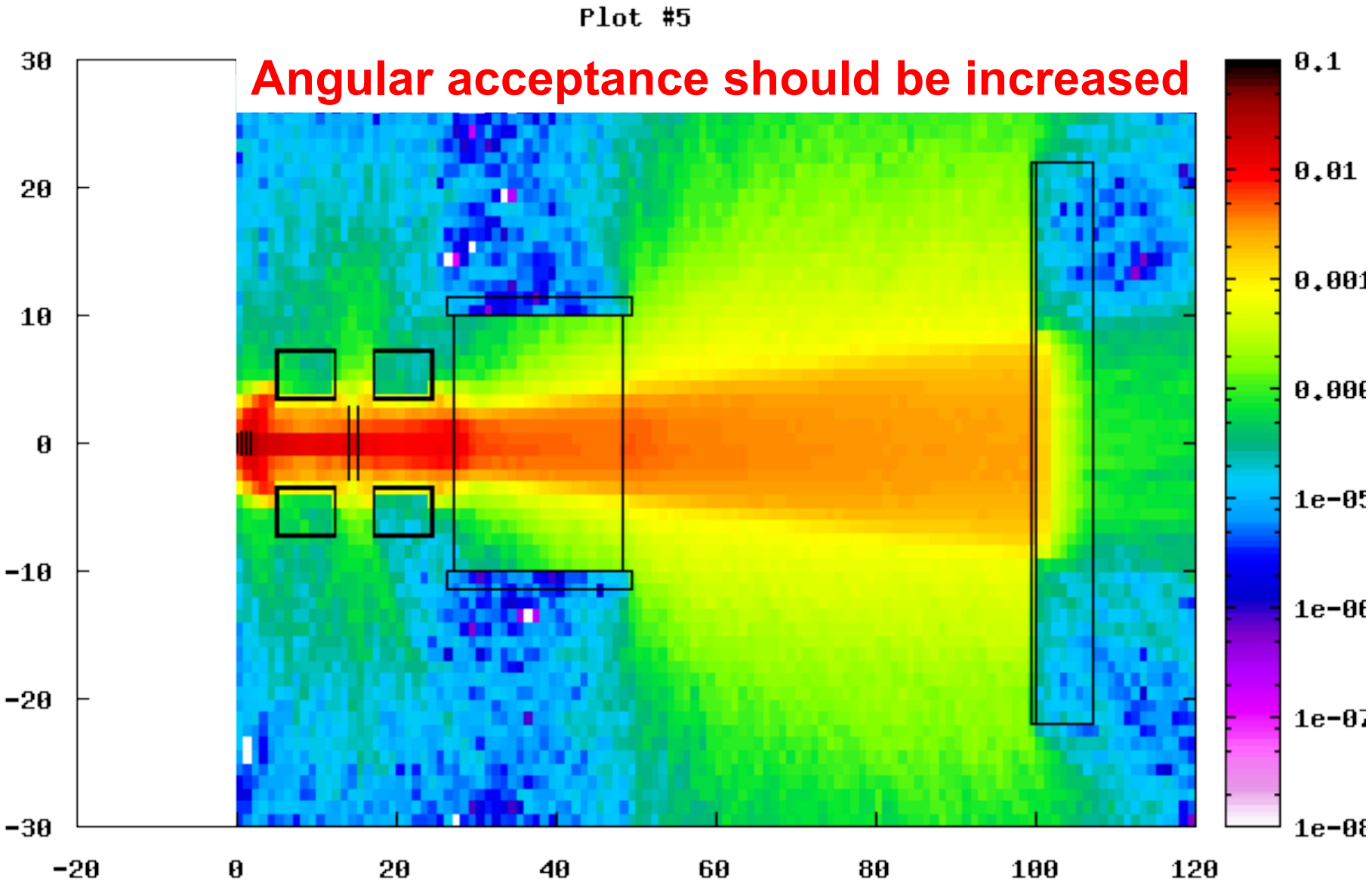
Scattering at 1st plane of DCH now more realistic



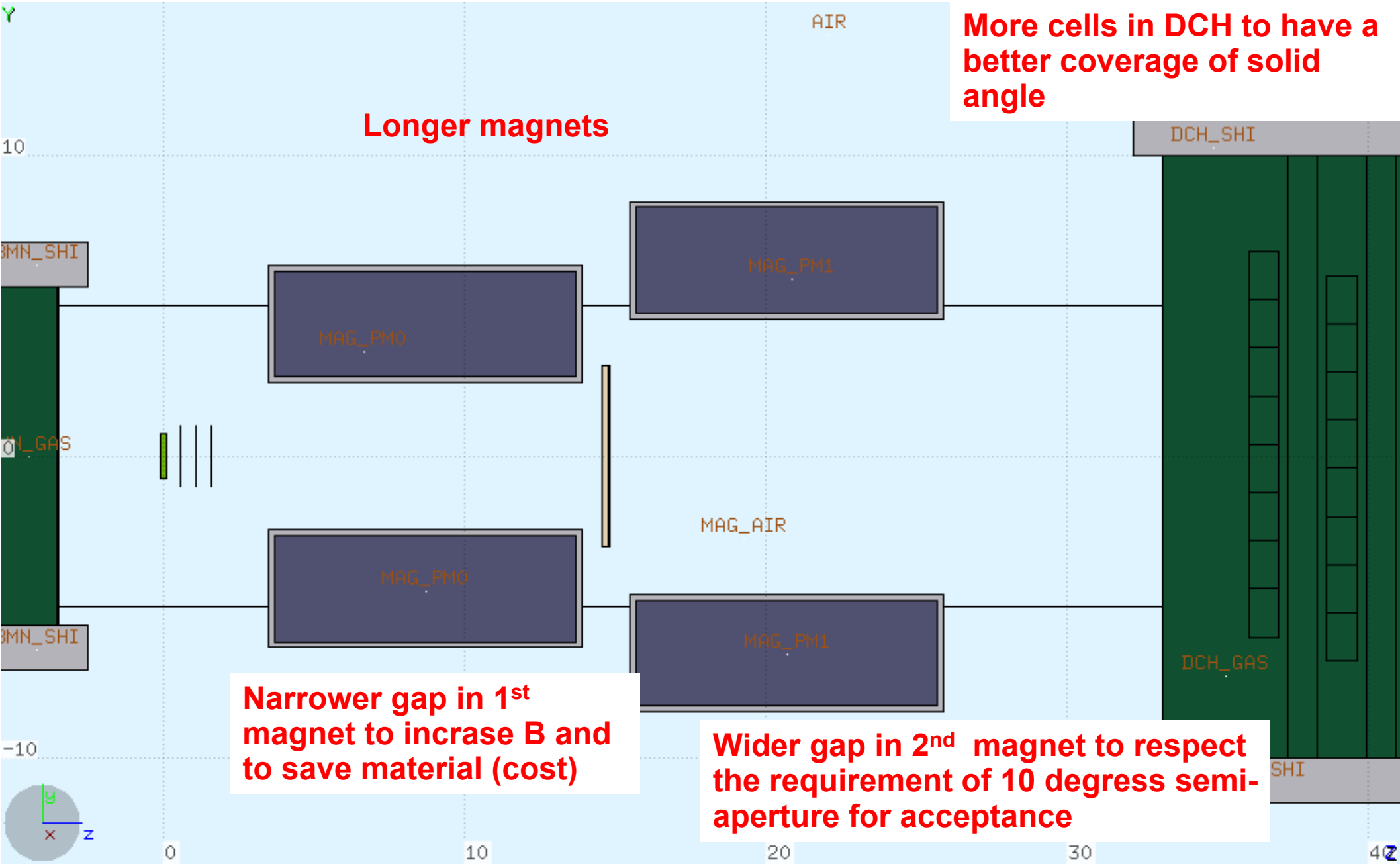
Discussion and questions

- Very probably we do not have a fundamental gain by considering a vacuum chamber
- An intermediate detector in the tracking region might remain important: → impact on p resolution can be evaluated only by global fit
- Can we think of something with less material? Notice that the projection of scattering from VTX detector is something in the range 60-70 mm
- The idea of a final detector with a resolution typical of a drift chamber is correct (we do not need something less 150 − 200 mm)
- We should consider to increase the length of the magnets to increase $B \cdot dl$

Shortcomings of the present design in simulation



Possible evolution of geometry



More cells in DCH to have a better coverage of solid angle

Longer magnets

Narrower gap in 1st magnet to incrase B and to save material (cost)

Wider gap in 2nd magnet to respect the requirement of 10 degress semi-aperture for acceptance