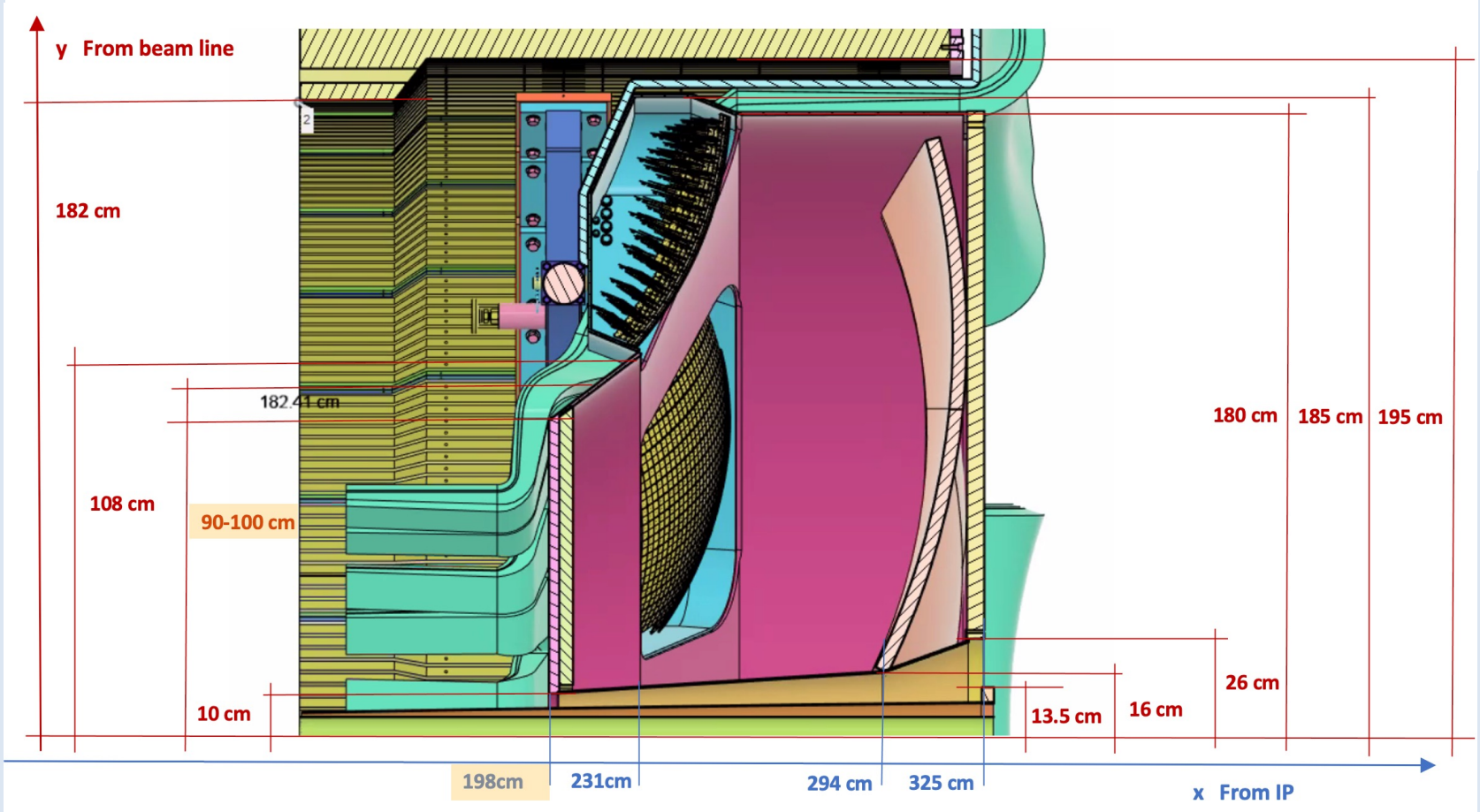
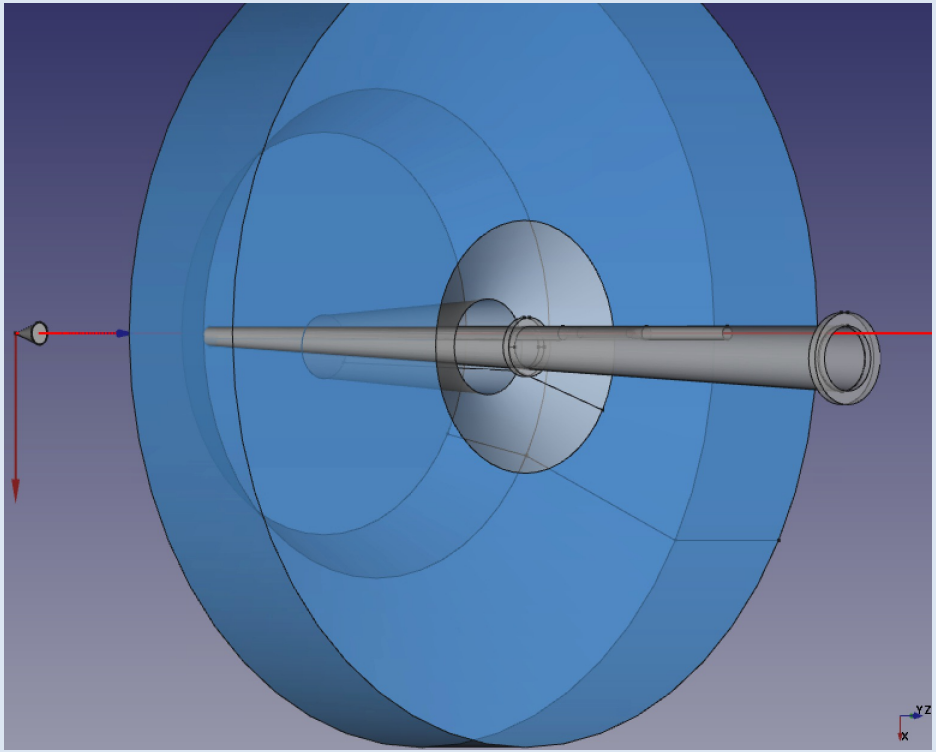
dRICH Envelope

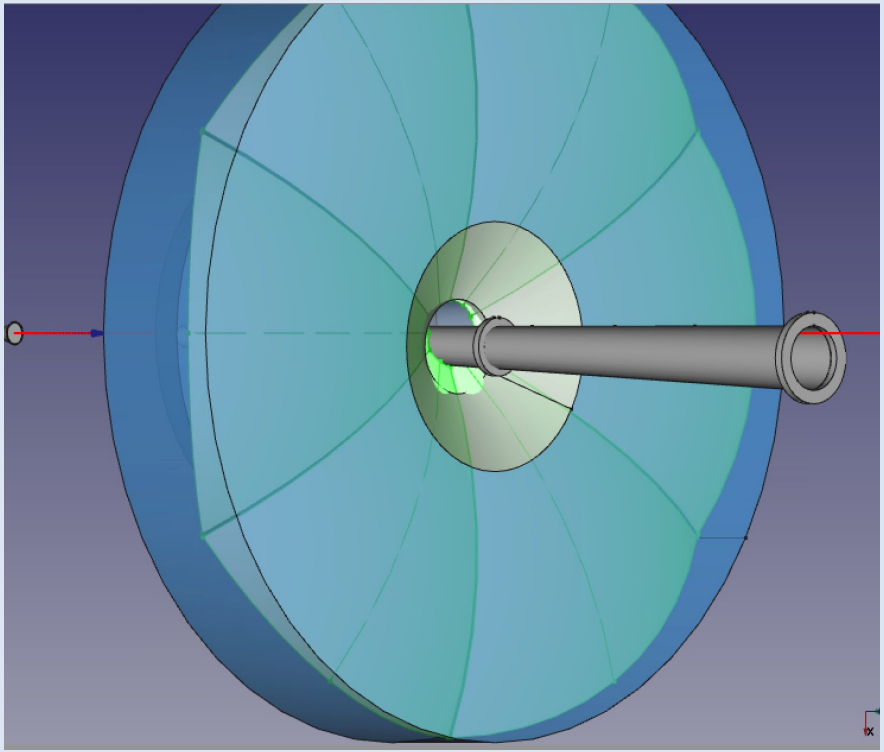
News: +3 cm downstream shift with respect the IP, O(10 cm) tolerance in aerogel disk radius



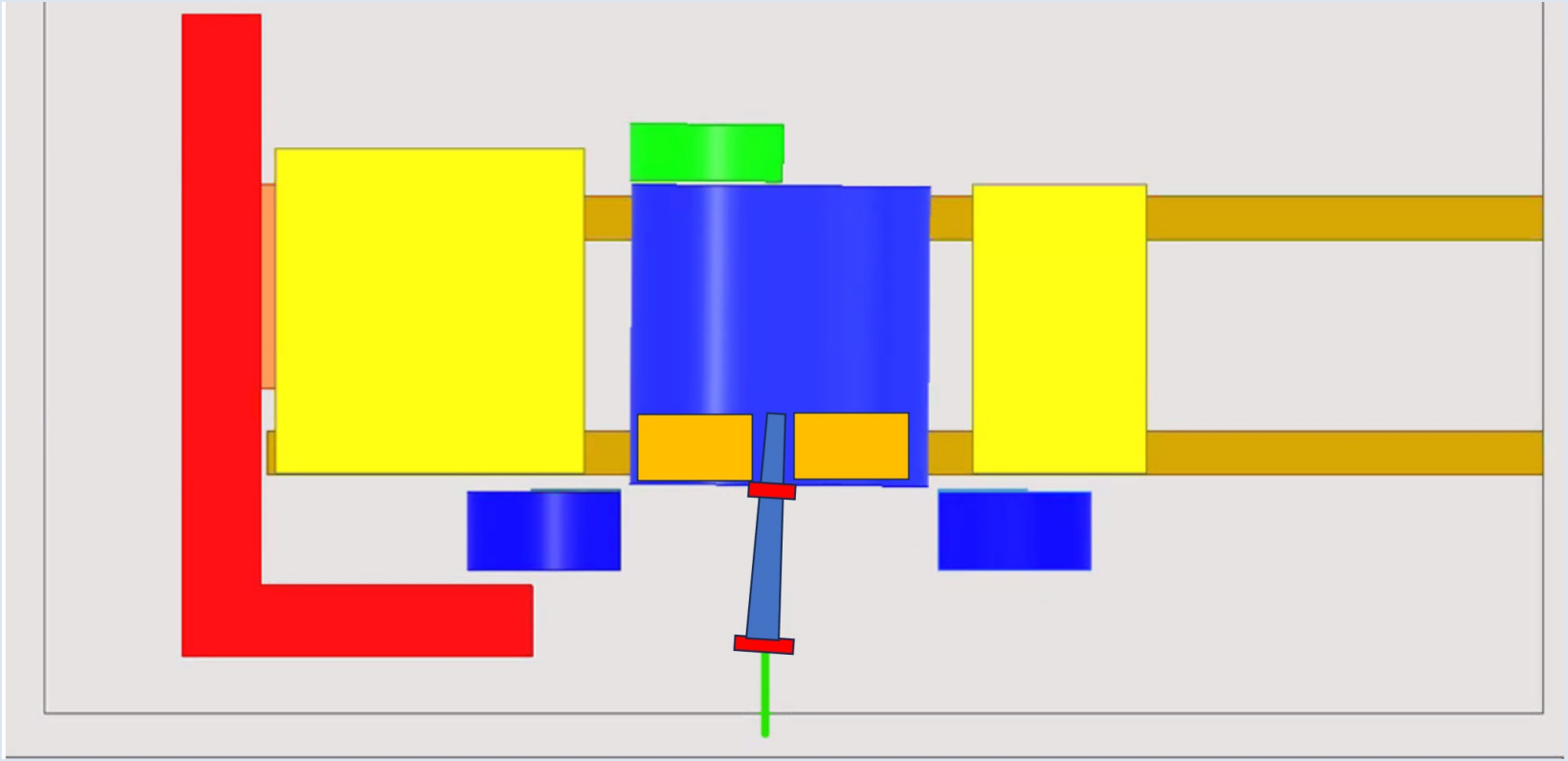
dRICH Envelope

The hadron beam angle forces an expanding pipe and a off-axis dRICH bore
dRICH bore should be big enough to provide clearance for the beam pipe during operations

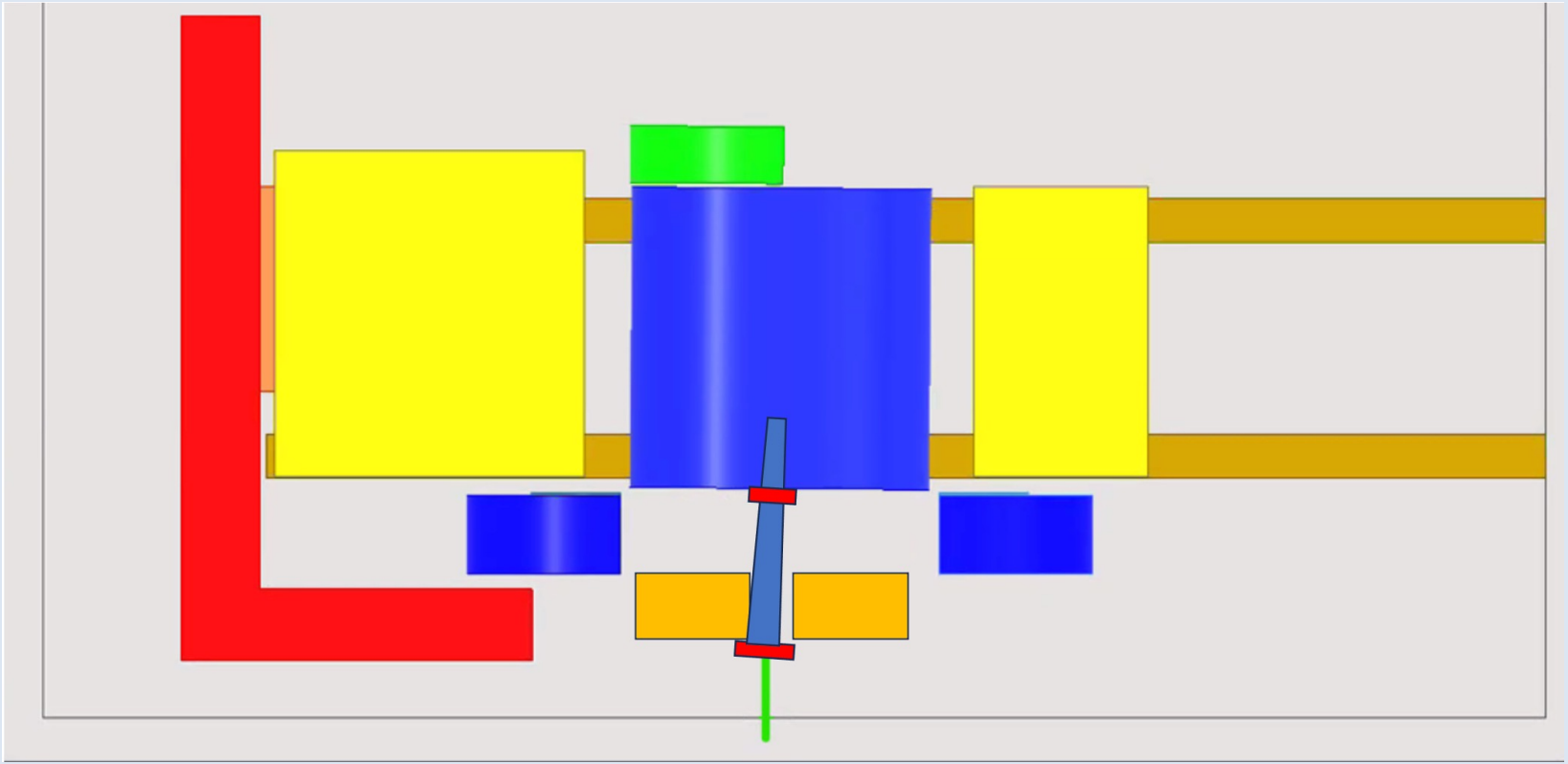


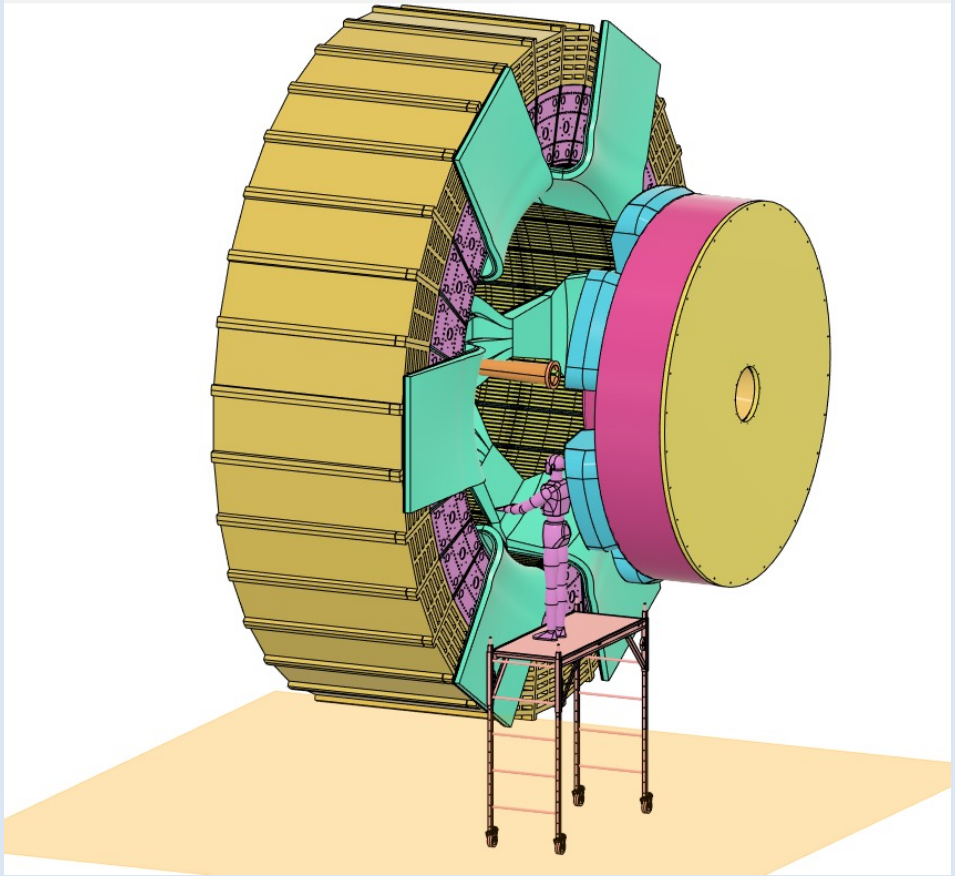


Rolling in and out a single piece

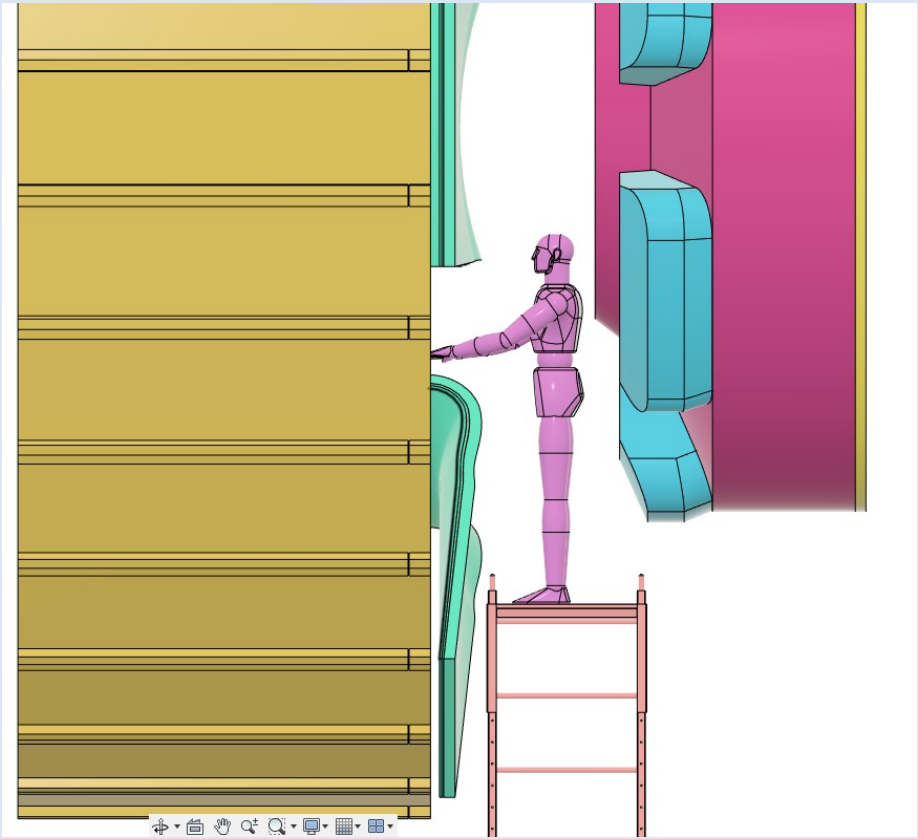


Rolling in and out a single piece

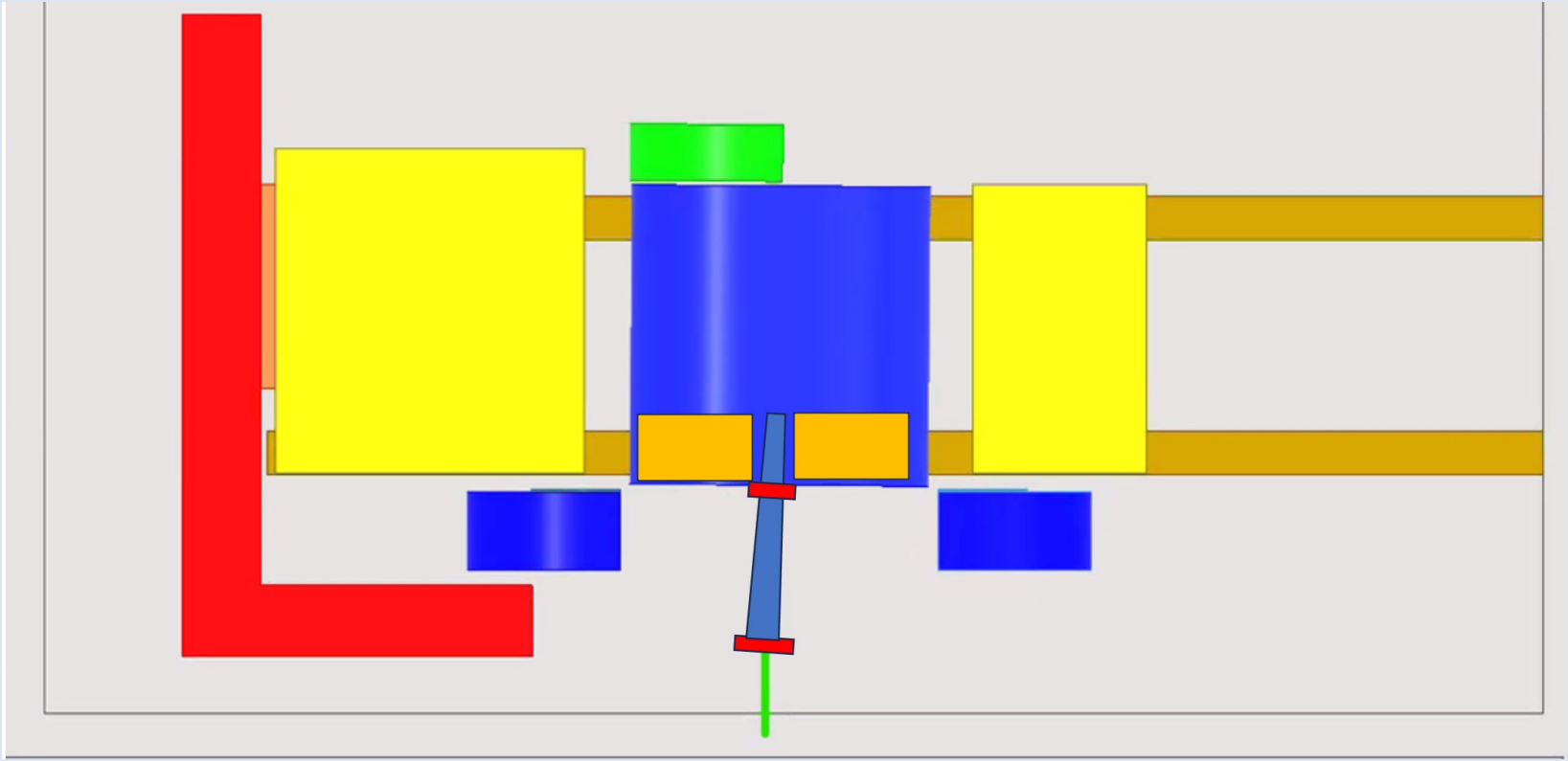




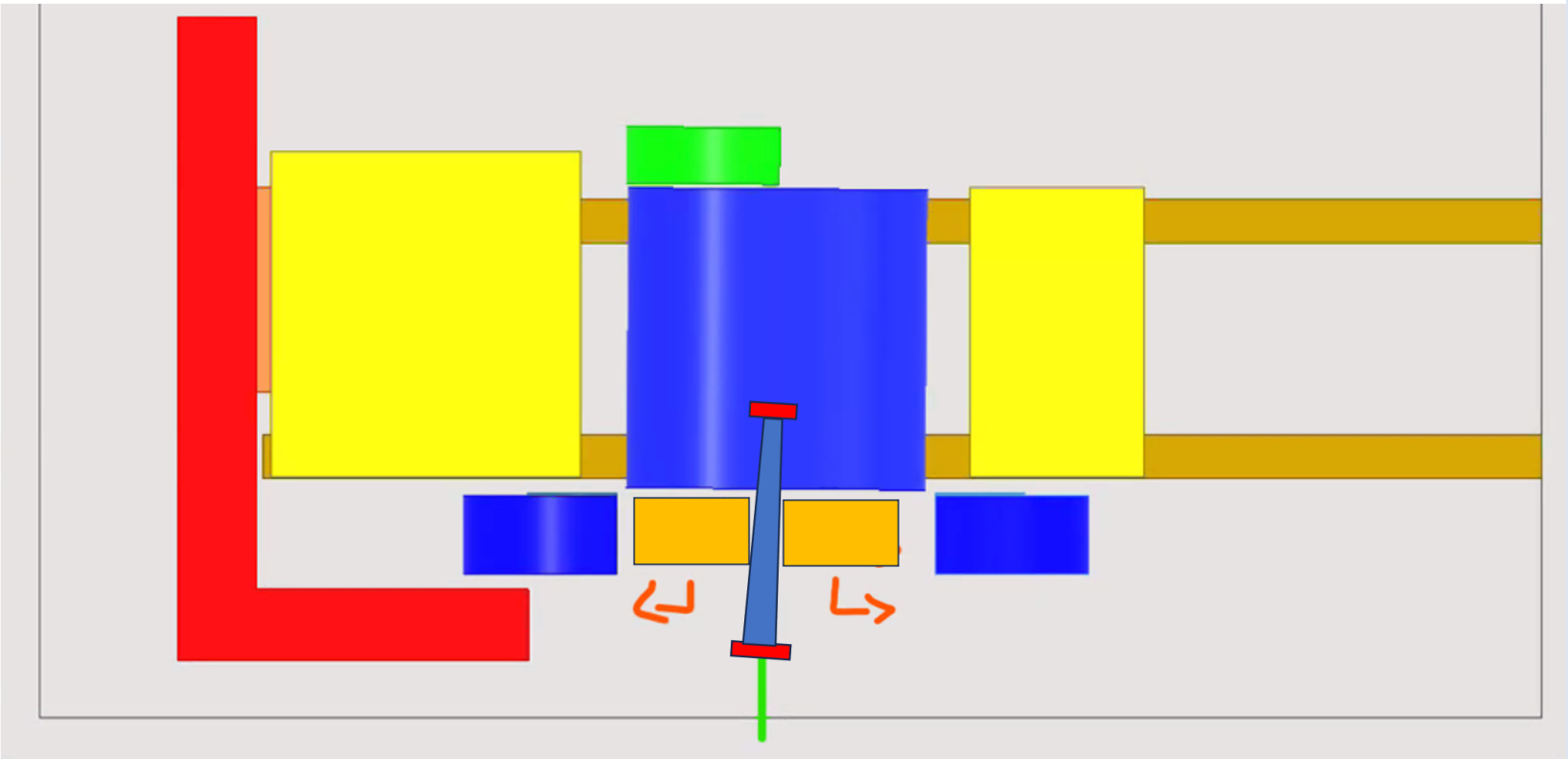
~ 70 cm clearance to enter the barrel



Divide into two halves as soon as out of ePIC



Divide into two halves as soon as out of ePIC

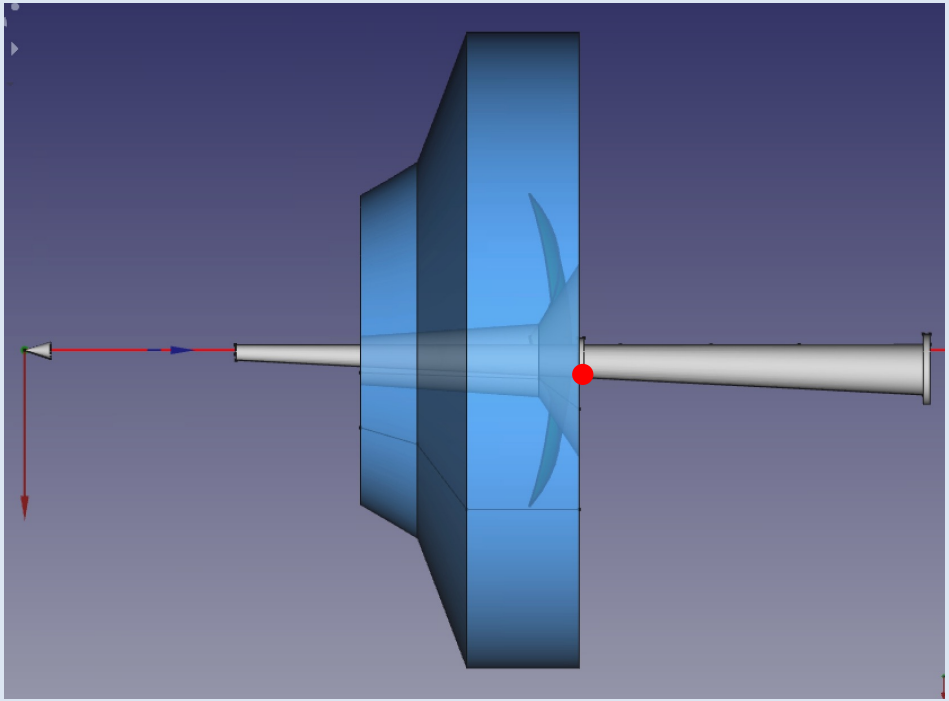


Decision pending on the maintenance plan at IP6 + dRICH acceptance study

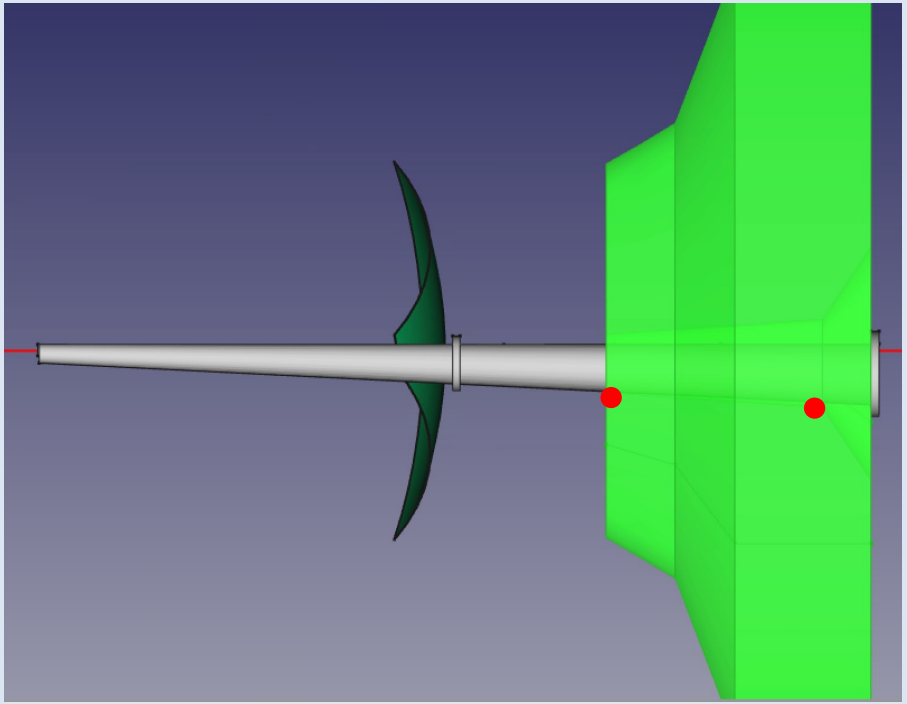
Case 1: single dRICH volume rolling in and out along the beam pipe

Mid-flange and pipe cross-section at the parking position provide similar constraint

Running position within ePIC



Parking position for maintenance

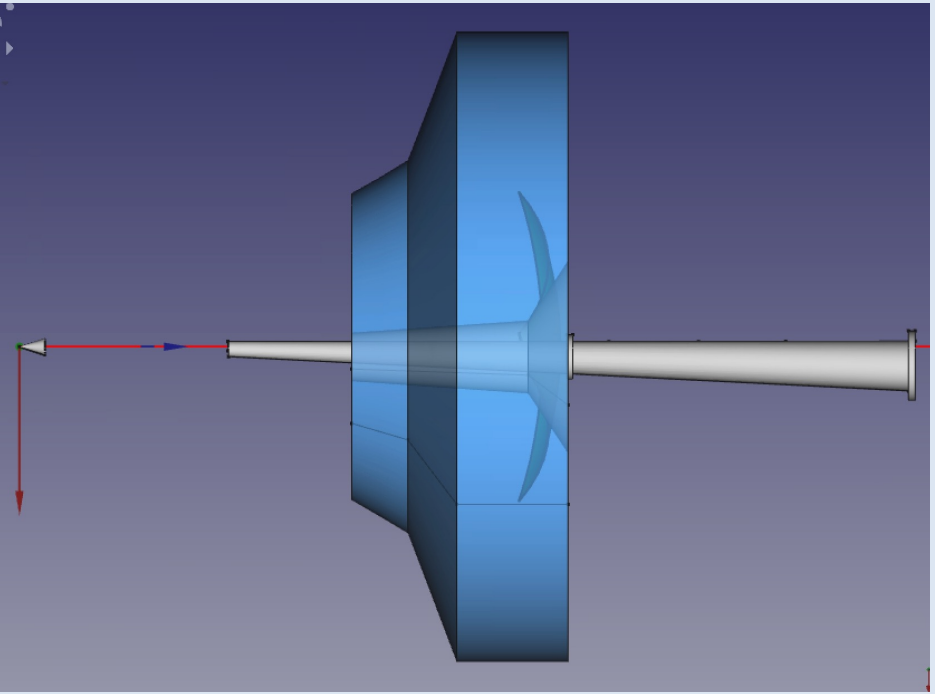


Case 2: two dRICH halvesto be divided as soon as outside ePIC

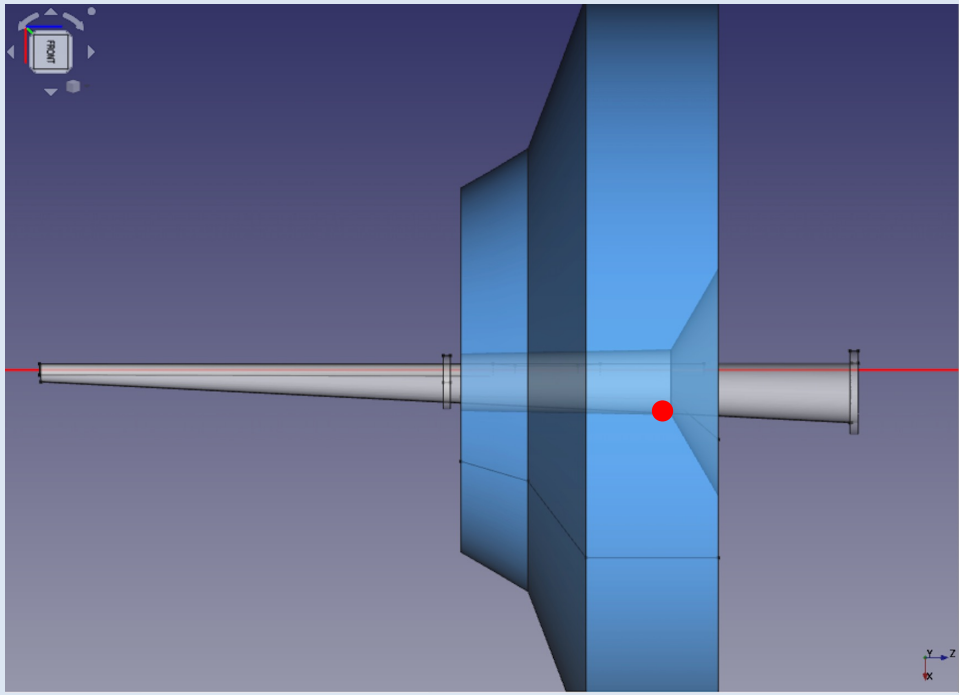
dRICH bore could be minimized if the mid-flange is moved in front of dRICH

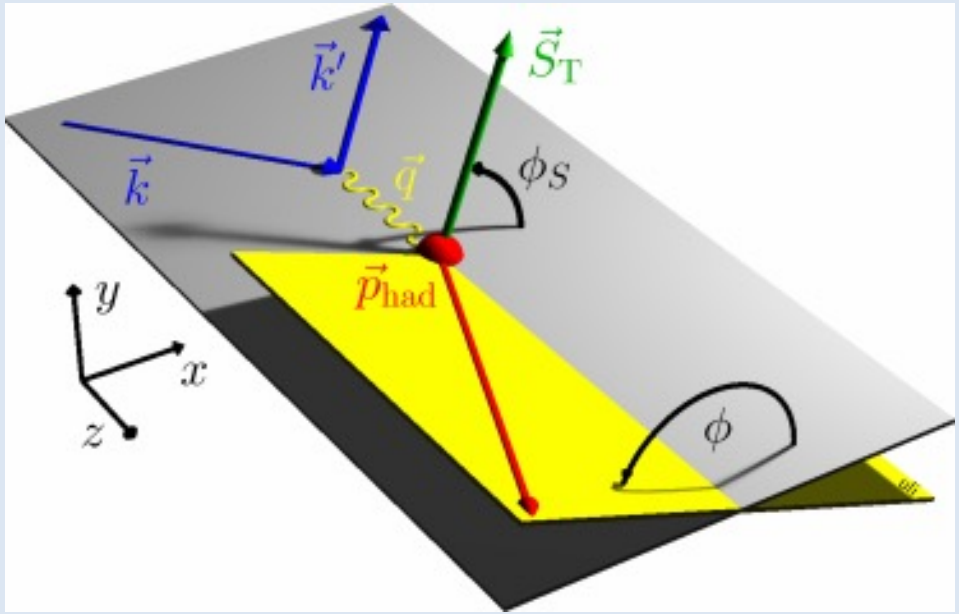
The septum will obstruct inter-sector photon propagation.

Running position within ePIC



Extraction position



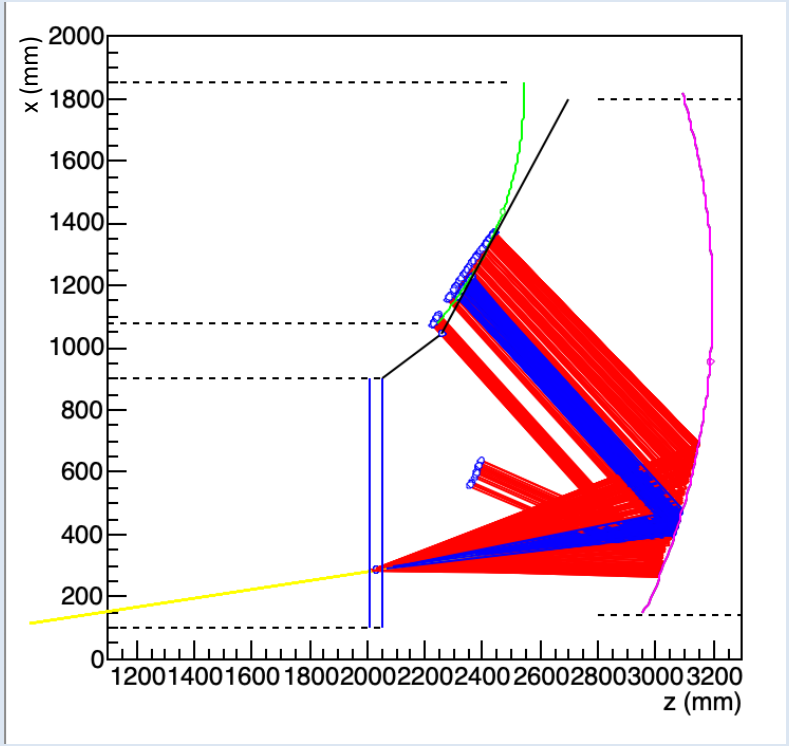


Notes (provisional):

- physics ϕ is defined vs the electron scattering plane, i.e. is not the laboratory ϕ_{LAB}
- pseudorapidity (and physics) should be defined with respect the hadron beam, not the solenoid axis

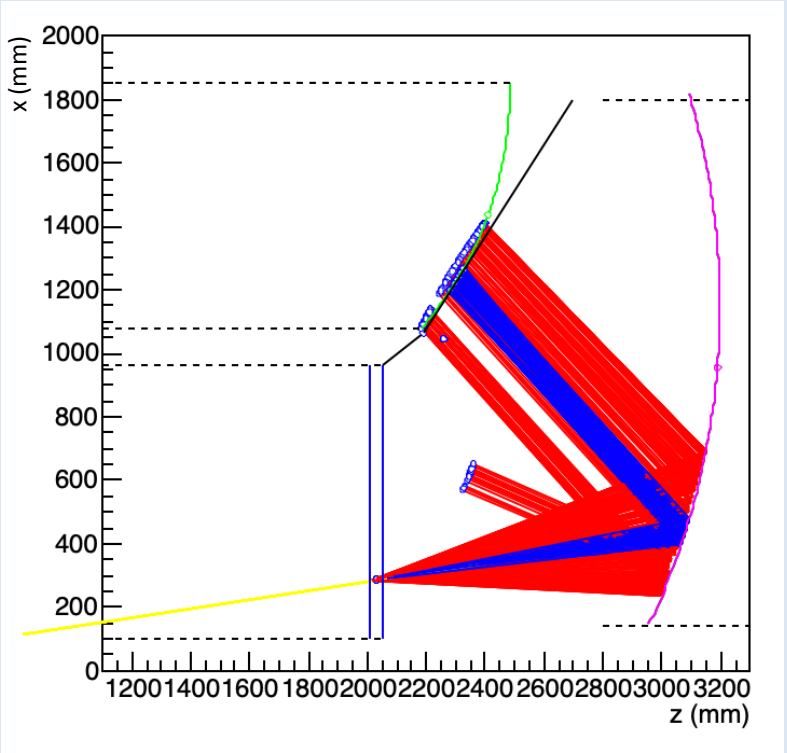
R_{aero} = 90 cm

DZ_{det} = 0 cm



R_{aero} = 96 cm

DZ_{det} = -6 cm



Note: pseudorapidity (and physics) is defined with respect the hadron beam, not the solenoid axis

DZ_{det} = 0 cm

n_{aero} = 1.020

R_{aero} = 90 cm

DZ_{det} = 0 cm

n_{aero} = 1.026

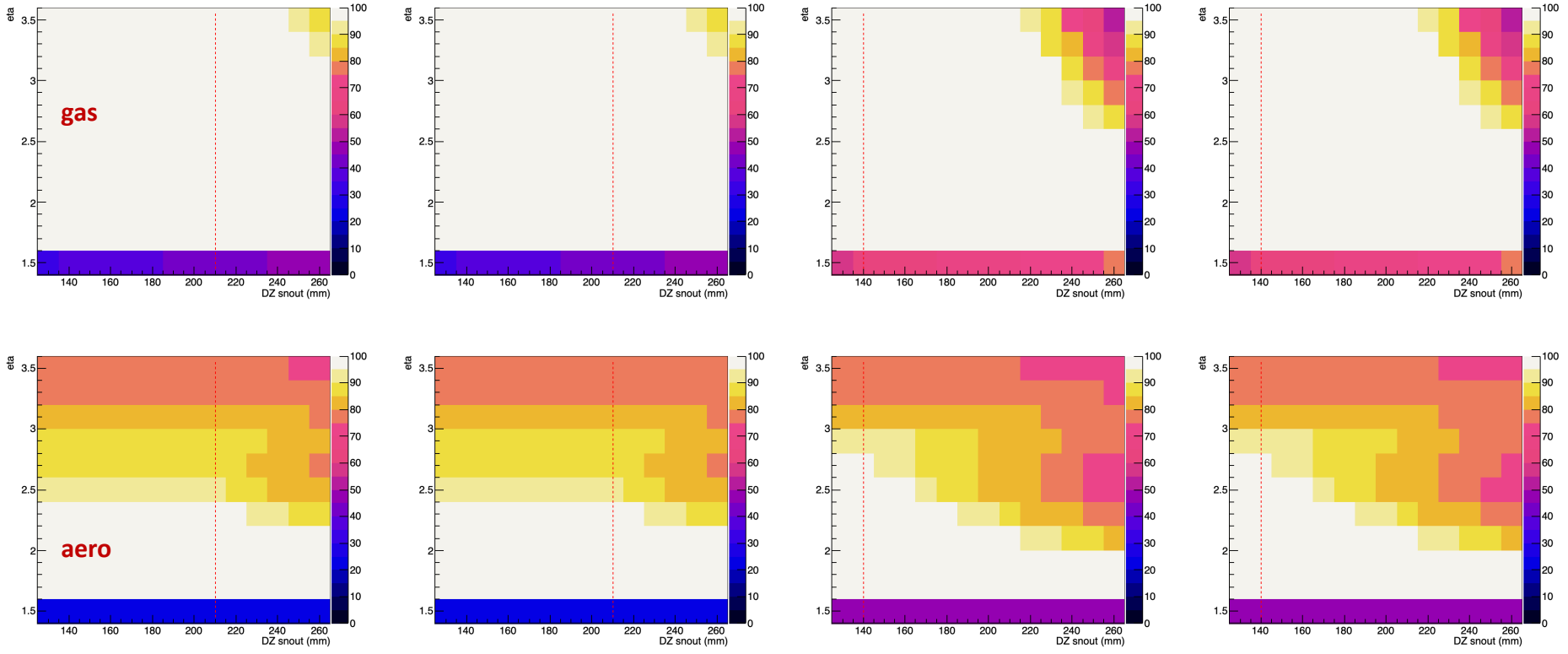
DZ_{det} = -6 cm

n_{aero} = 1.020

R_{aero} = 96 cm

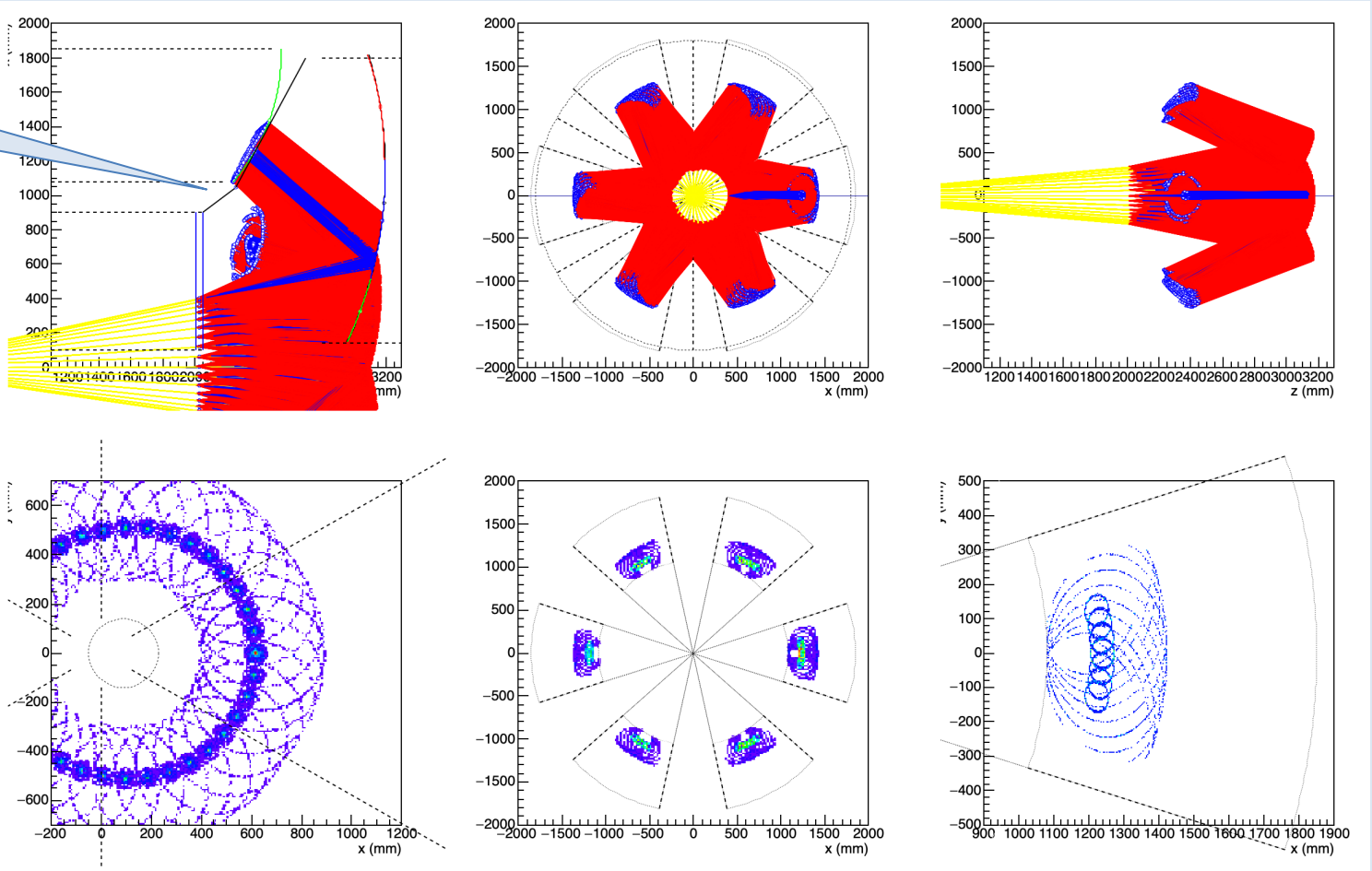
DZ_{det} = -6 cm

n_{aero} = 1.026



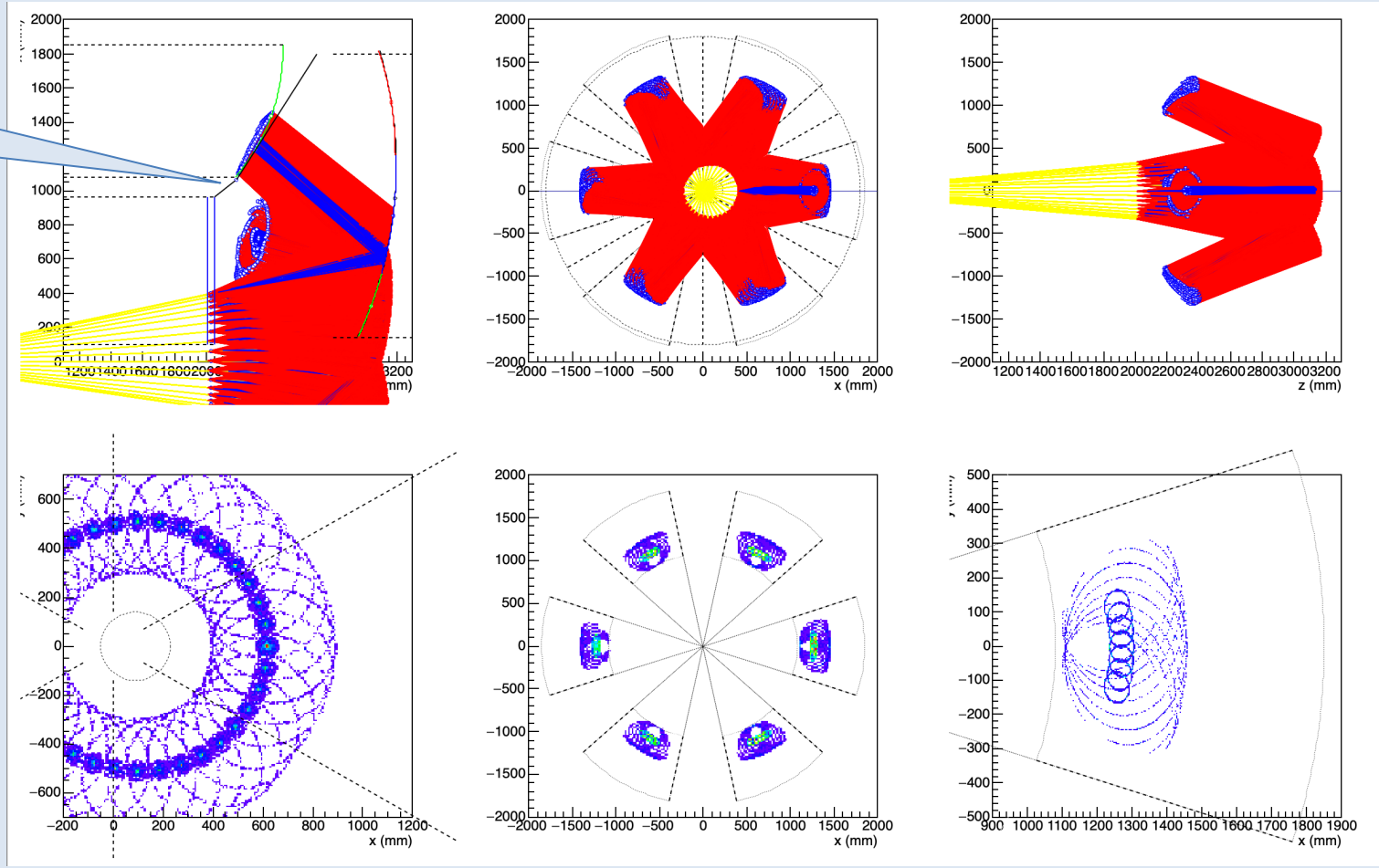
Imaging @ η=2.5

R_{AERO}= 90 cm
DZ_{SNOUT} = 21 cm



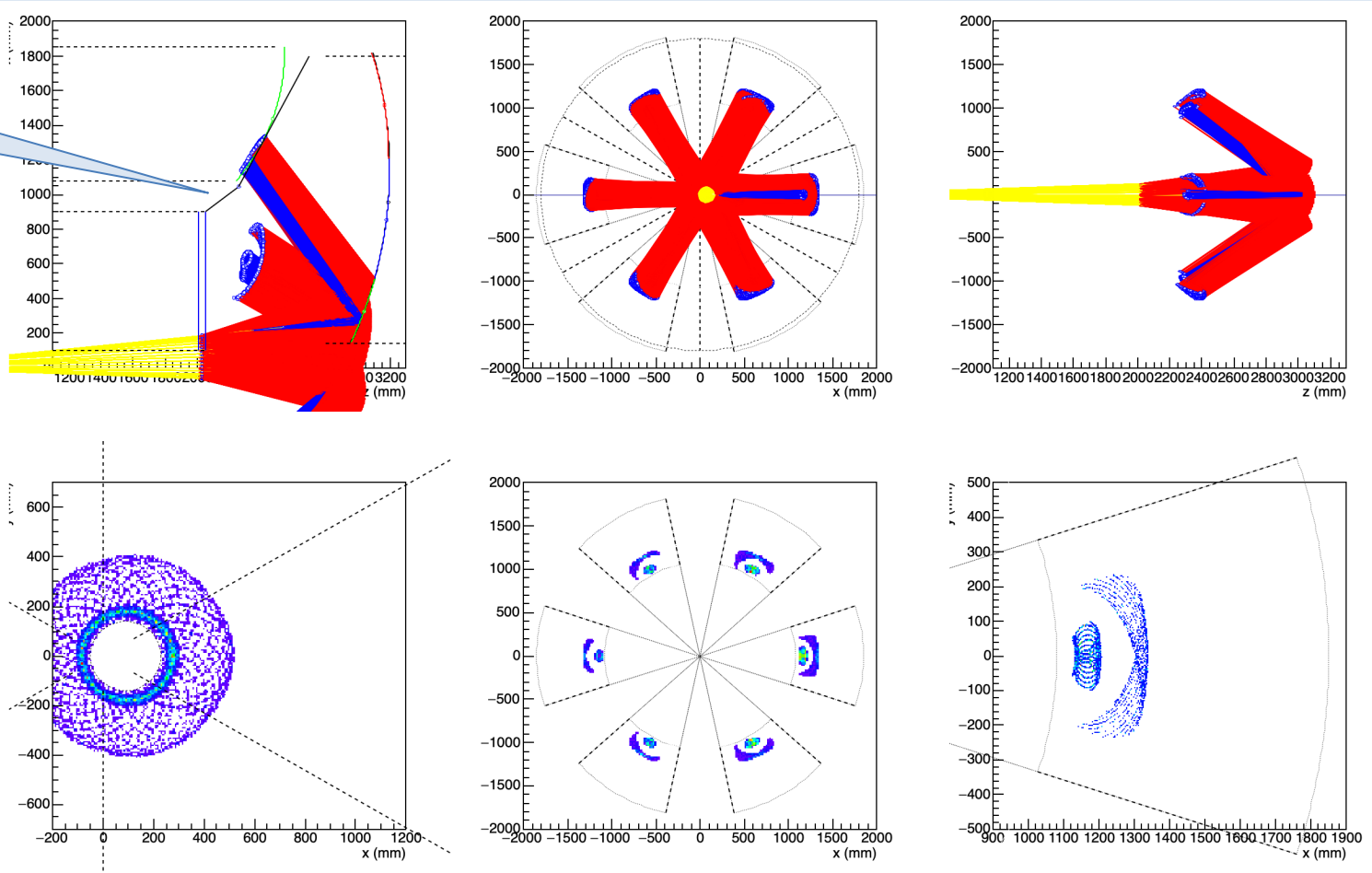
Imaging @ η=2.5

R_{AERO}= 96 cm
DZ_{SNOUT} = 14 cm
DZ_{DET}= -6 cm



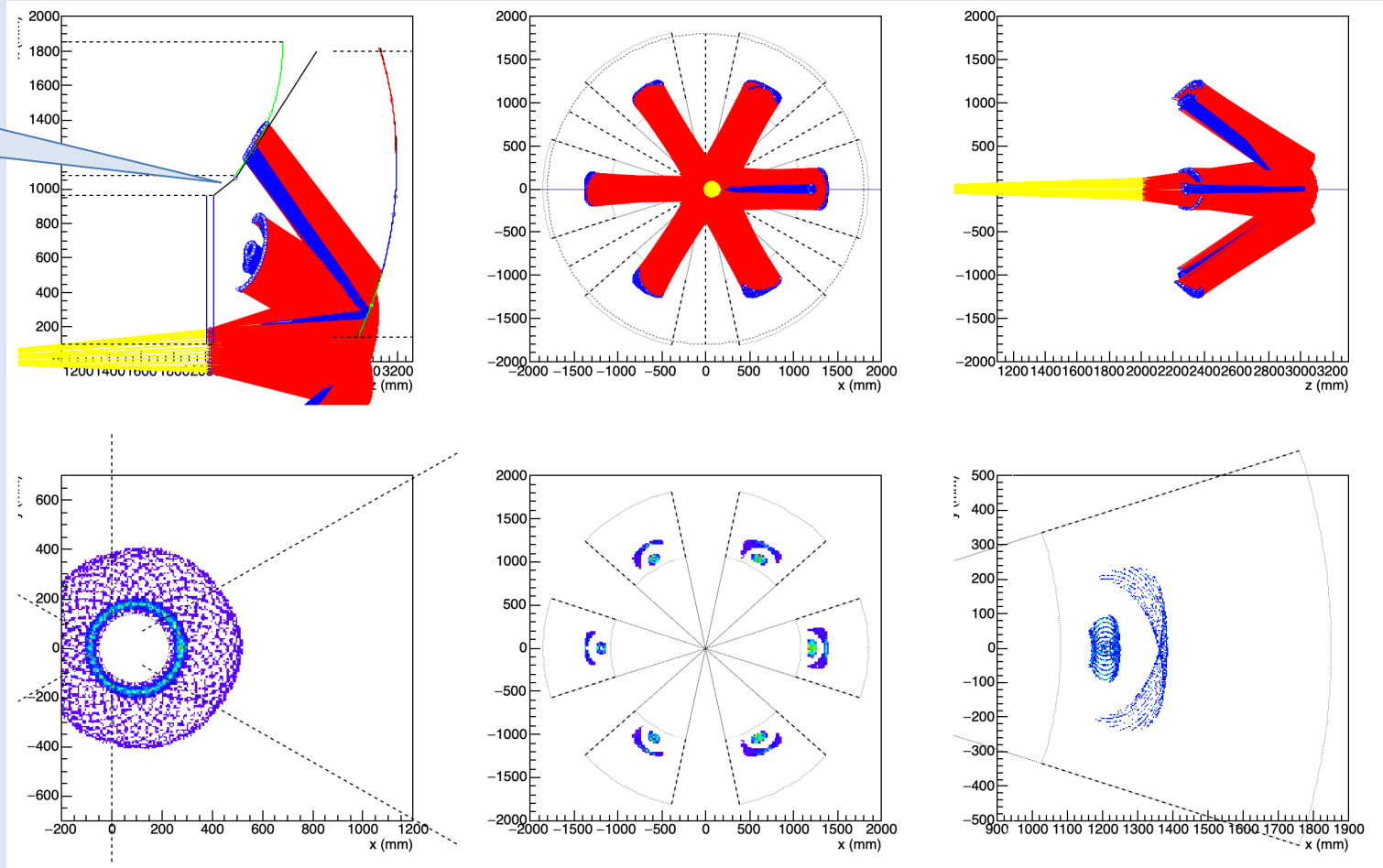
Imaging @ η=3.5

R_{AERO}= 90 cm
DZ_{SNOUT} = 21 cm



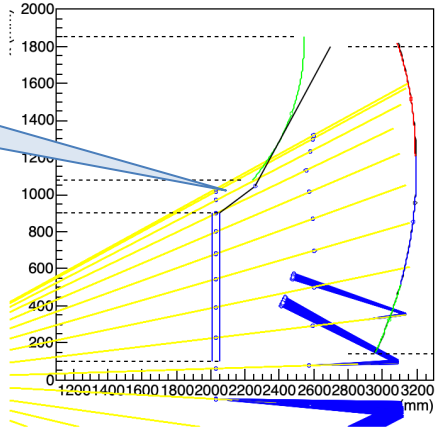
Imaging @ η=3.5

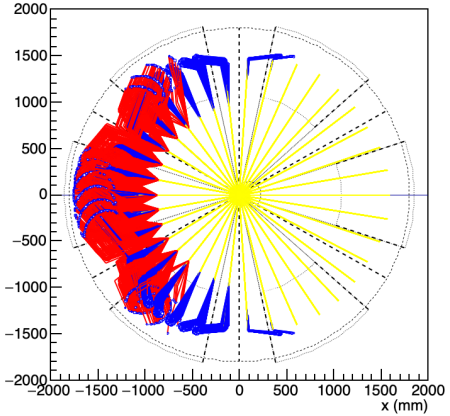
R_{AERO}= 96 cm
DZ_{SNOUT} = 14 cm
DZ_{DET}= -6 cm

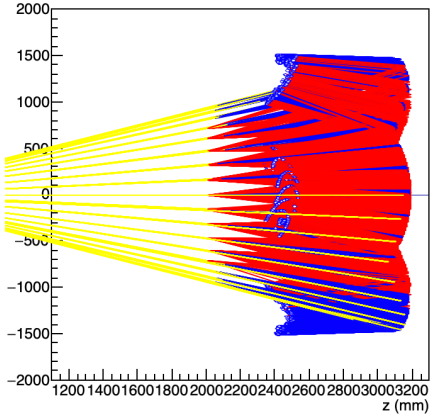


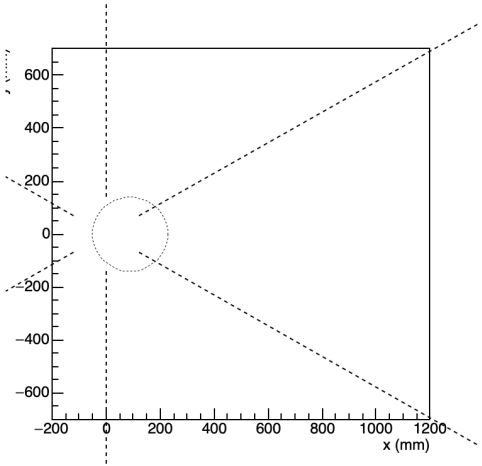
Imaging @ η=1.5

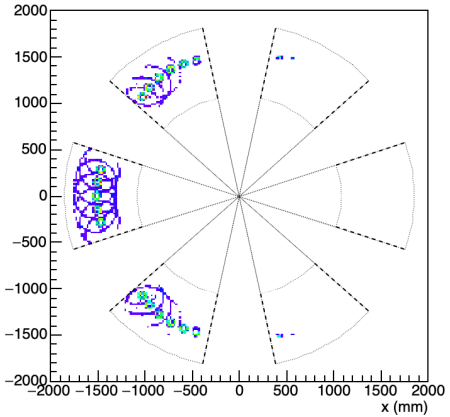
R_{AERO}= 90 cm
DZ_{SNOUT} = 21 cm

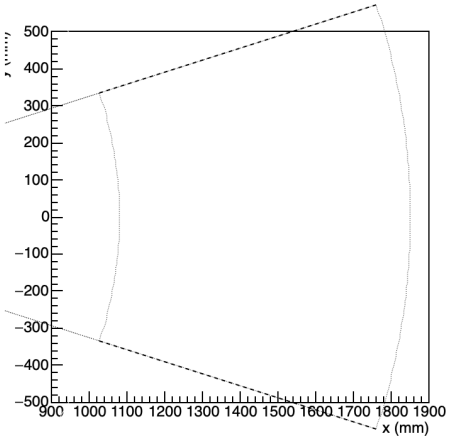






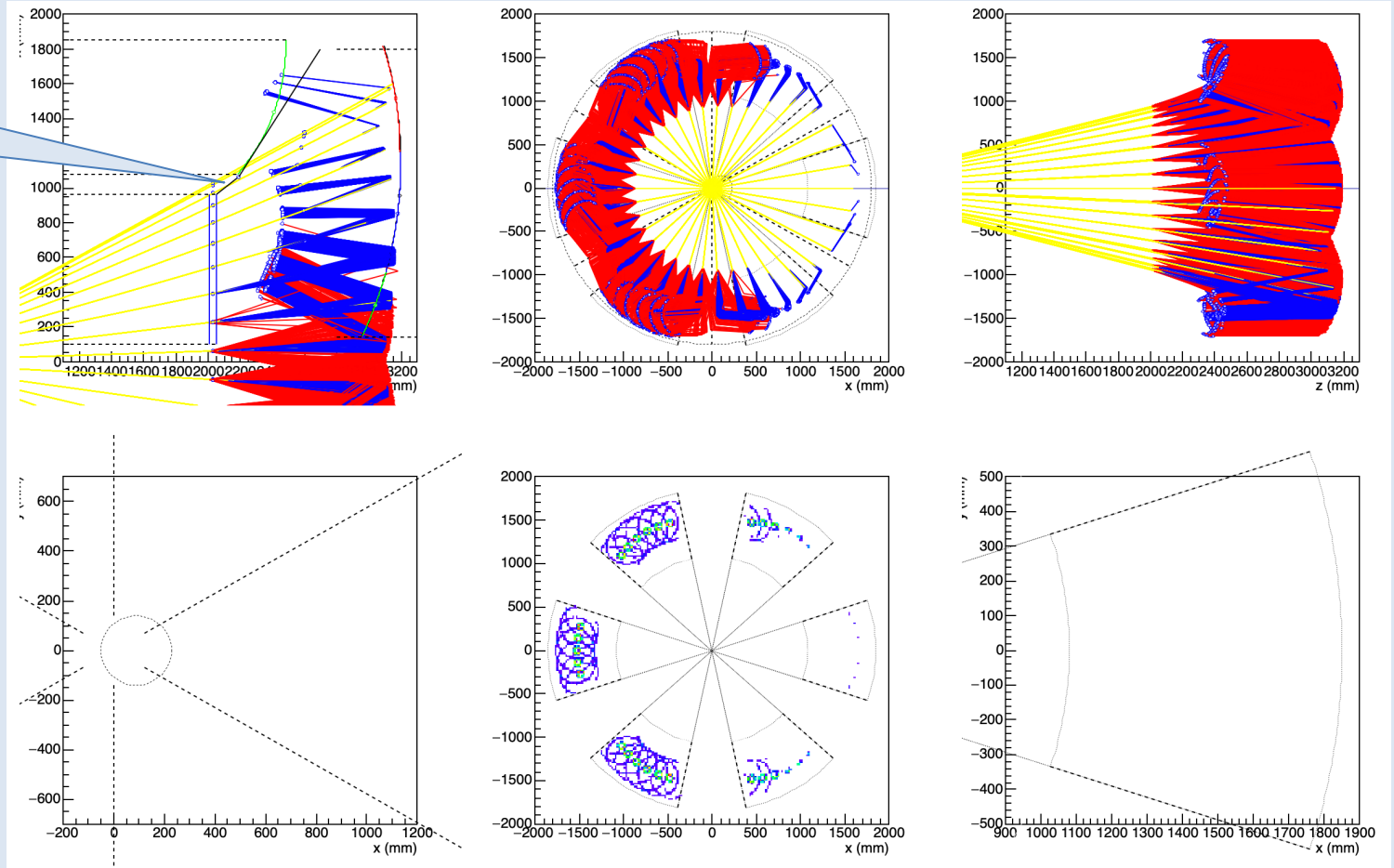






Imaging @ η=1.5

R_{AERO}= 96 cm
DZ_{SNOUT} = 14 cm
DZ_{DET}= -6 cm



DZ_{det} = 0 cm

n_{aero} = 1.020

R_{aero} = 90 cm

DZ_{det} = 0 cm

n_{aero} = 1.026

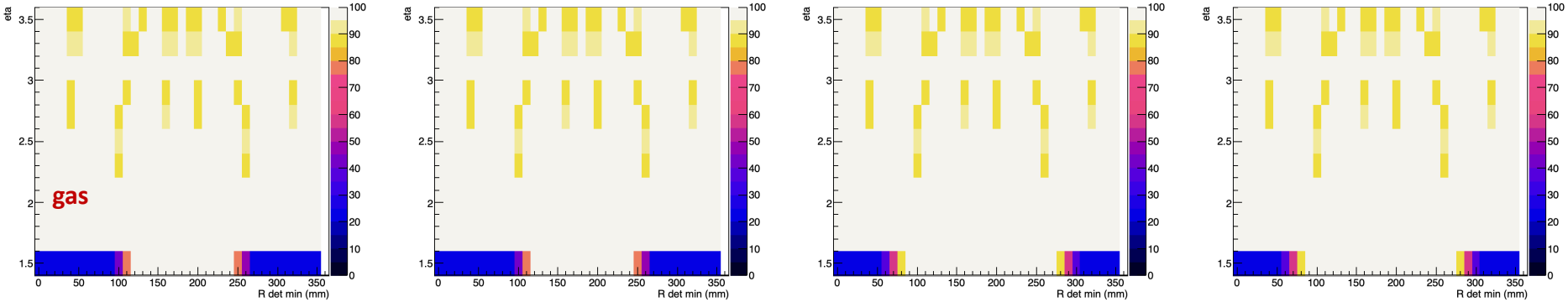
DZ_{det} = -6 cm

n_{aero} = 1.020

R_{aero} = 96 cm

DZ_{det} = -6 cm

n_{aero} = 1.026



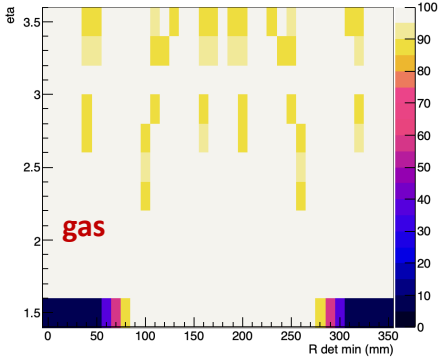
n_{AERO} = 1.026 **R_{aero} = 96 cm** **DZ_{det} = -6 cm**

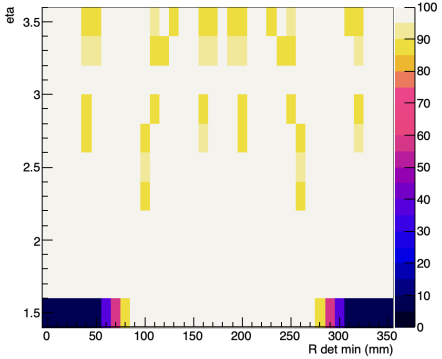
R_{bore} = 10-14 cm

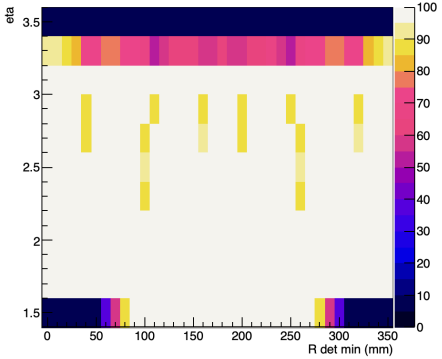
R_{bore} = 14-14 cm

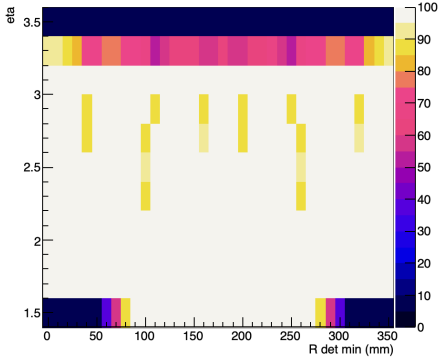
R_{bore} = 10-21 cm

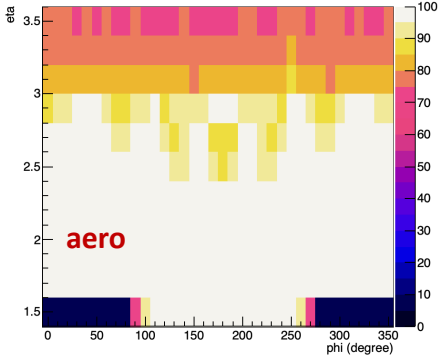
R_{bore} = 14-21 cm

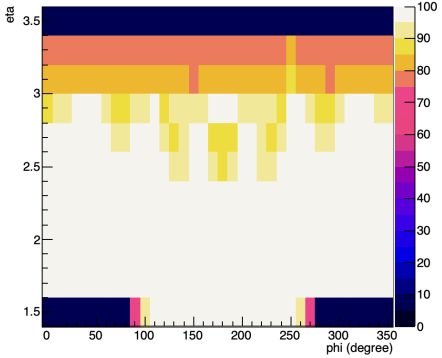


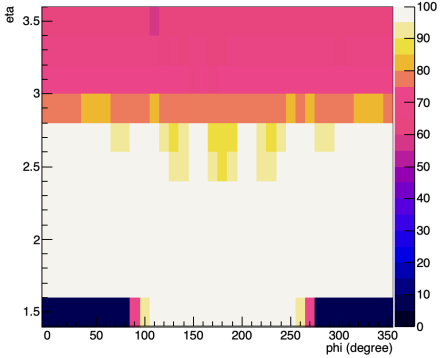


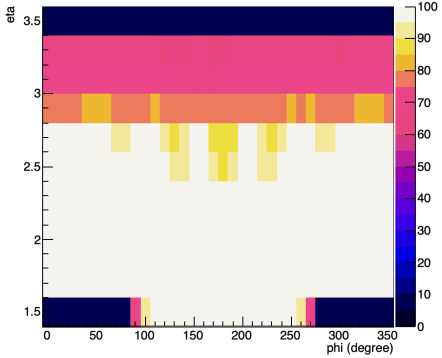












dRICH Halves

n_{AERO} = 1.026 **R_{aero} = 96 cm** **DZ_{det} = -6 cm**

R_{bore} = 10-14 cm

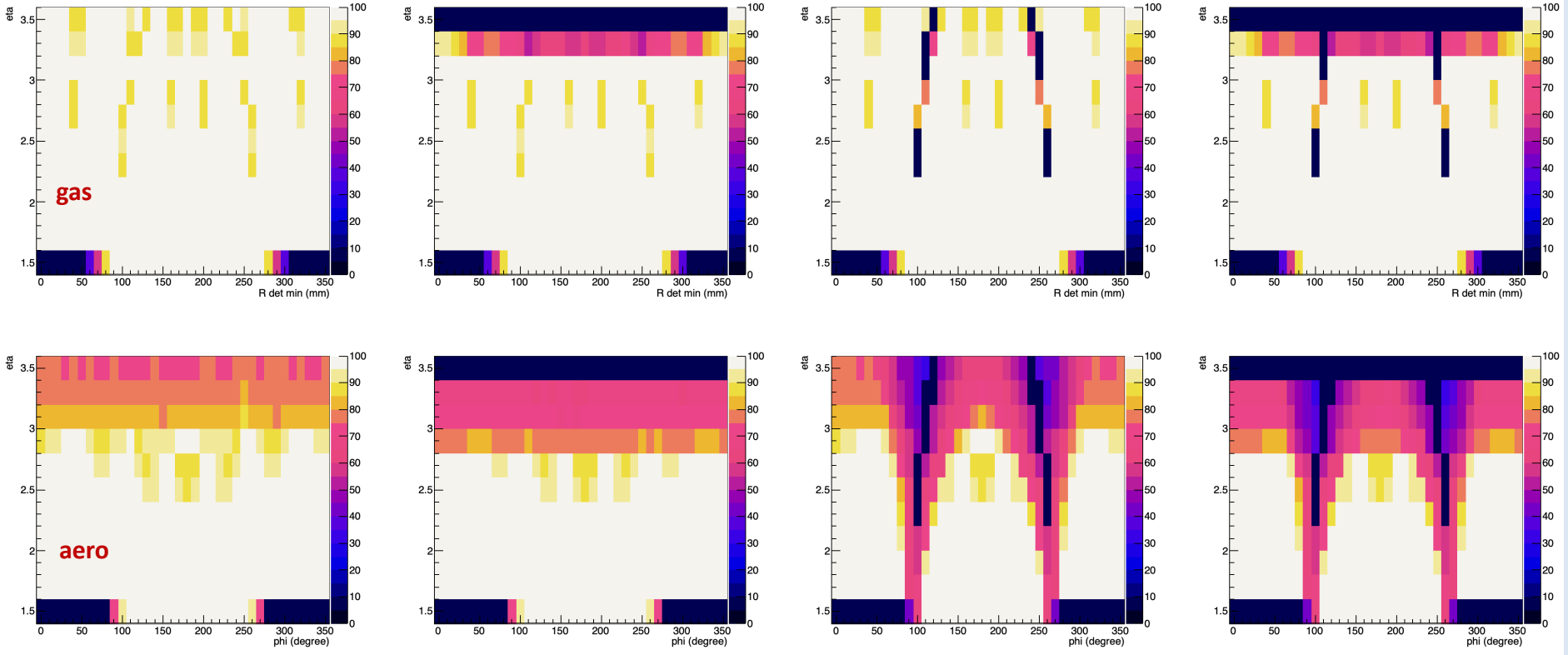
R_{bore} = 14-21 cm

2 halves

R_{bore} = 10-14 cm

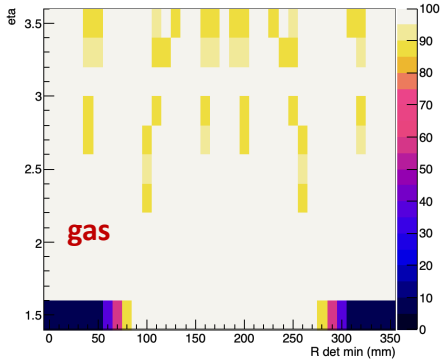
2 halves

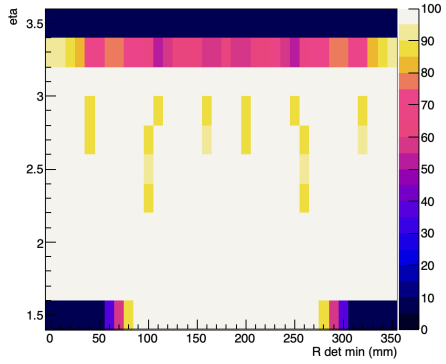
R_{bore} = 14-21 cm

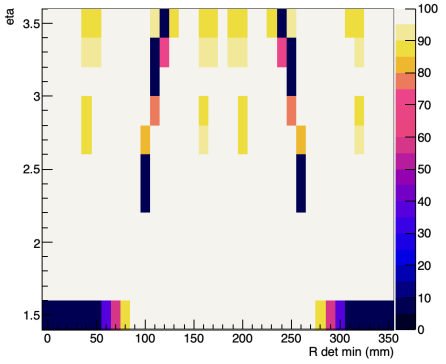


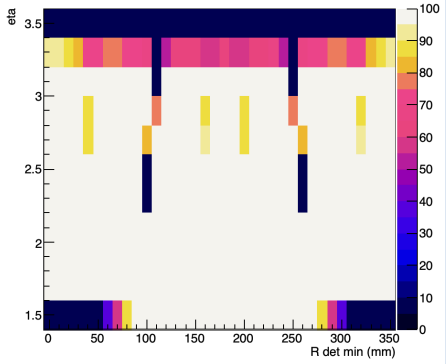
Case 1
Large bore

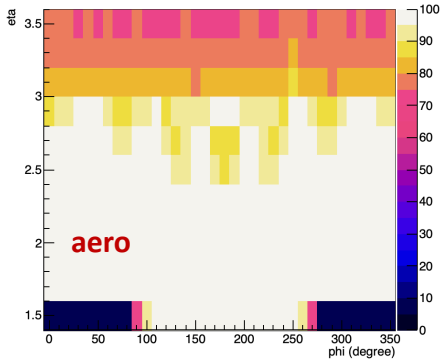
Case 2
Two halves

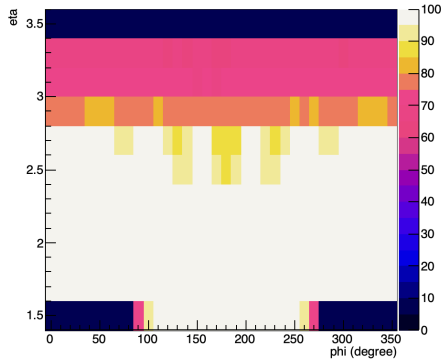


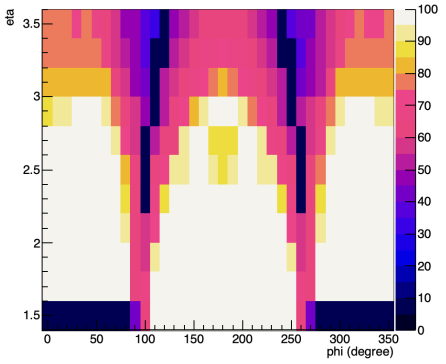


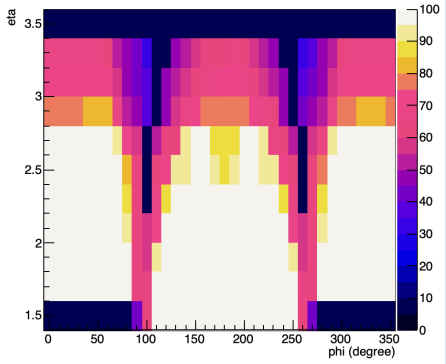




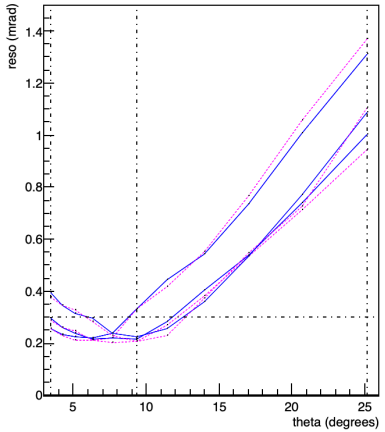


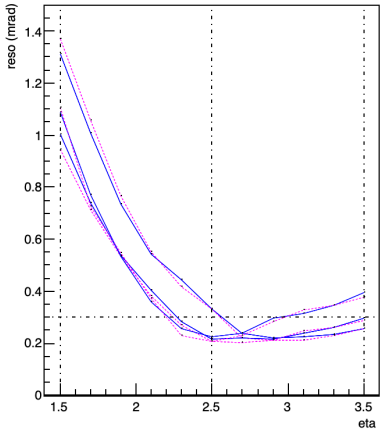


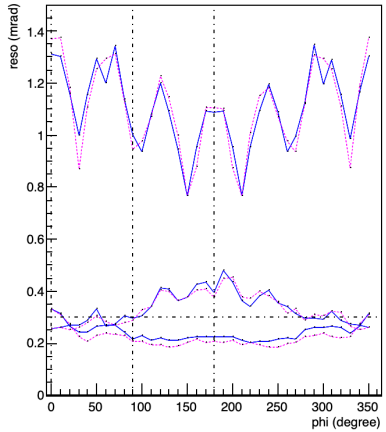


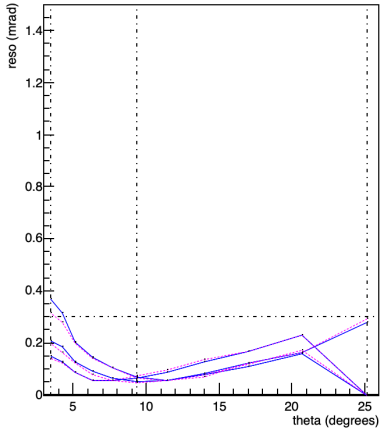


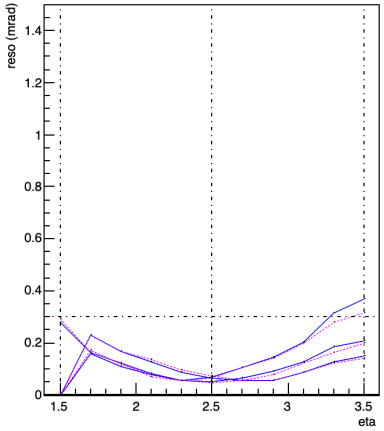
dRICH Resolution

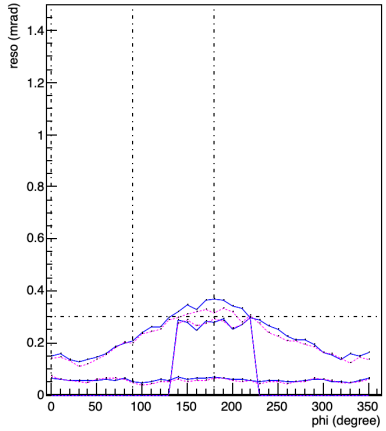












There is some flexibility on the maximum aerogel radius:
potential benefit for acceptance;
important tolerance for mechanics.

The ePIC asymmetric pipe suggests an off-axis bore for the dRICH.

The maintenance at IP6 (without beam vacuum break) impose constraints on the dRICH model

- large bore: loss in pseudorapidity acceptance (unrecoverable)

- split into two halves: loss in azimuthal acceptance (mitigated by ϕ_{LAB} invariance)