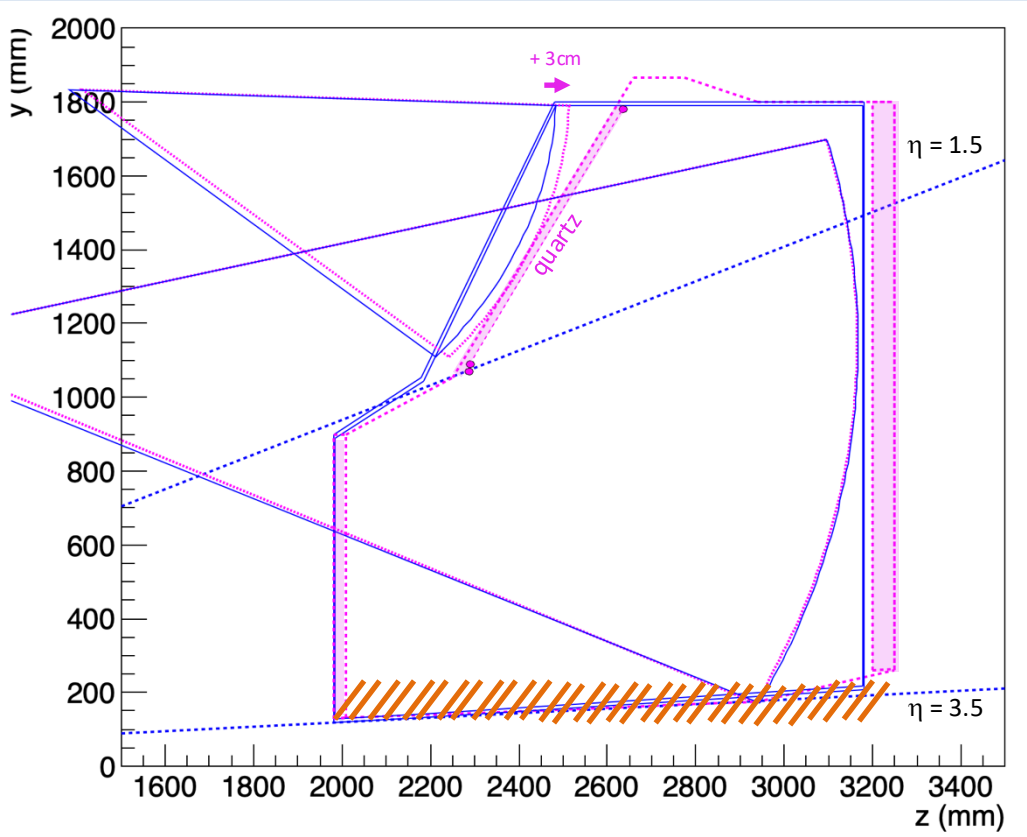
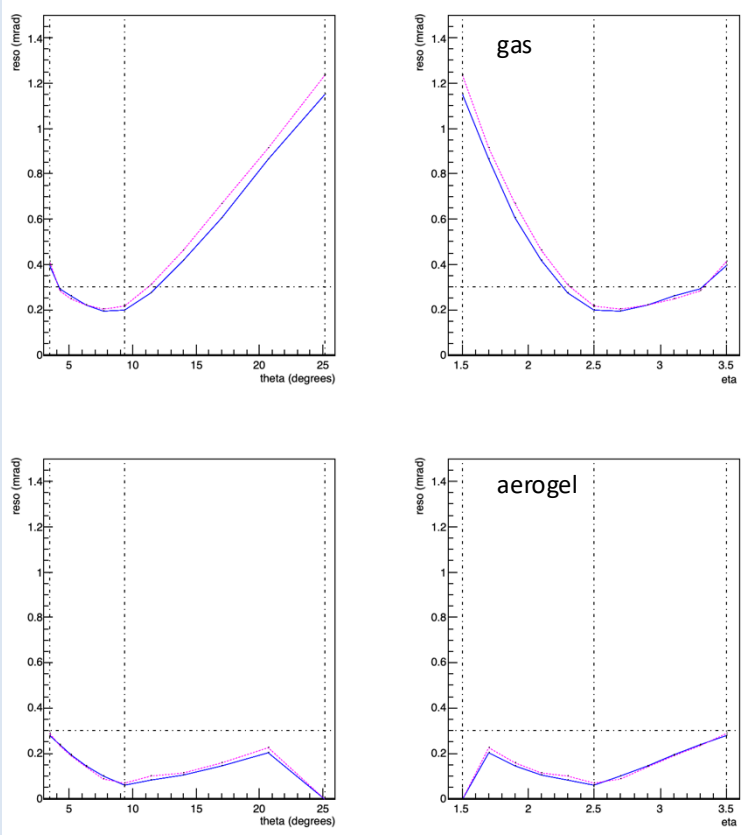
dRICH Relevant Dimensions

– dd4hep standard – mechanics standard



Resolution due to emission uncertainty



dRICH Relevant Dimensions

Simulation Baseline

```
Processing from_dilks.c...
CentralTrackingRegionP_zmax          1800.00 mm
ForwardPIDRegion_zmin                1800.00 mm
ForwardTOFRegion_length               150.00 mm
ForwardRICHRegion_zmin               1950.00 mm
DRICH_zmin                           1980.00 mm
vesselZmin                           1980.00 mm
---------------------------------------
ForwardPIDRegion_length              1350.00 mm
ForwardRICHRegion_length             1200.00 mm
DRICH_length                         1200.00 mm
vesselLength                         1200.00 mm
vesselZmax                           3180.00 mm
---------------------------------------
DRICH_exit_window_thickness             3.00 mm
mirrorBackplane                        13.00 mm
mirrorThickness                         0.00 mm
mirrorReflective                       13.00 mm
b                                    3167.00 mm
---------------------------------------
sensorSphCenter (Z, X)      (         -596.00,          1834.00) mm
S               (Z, X)      (         1384.00,          1834.00) mm
focus_tune      (Z, X)      (           61.50,           -70.00) mm
focusTune       (Z, X)      (           61.50,           -70.00) mm
F               (Z, X)      (         1445.50,          1834.00) mm

mirrorCenter    (Z, X)      (          936.46,          1142.80) mm
mirrorRadius                         2230.54 mm
---------------------------------------
```

Mechical Model – Real scale prototype

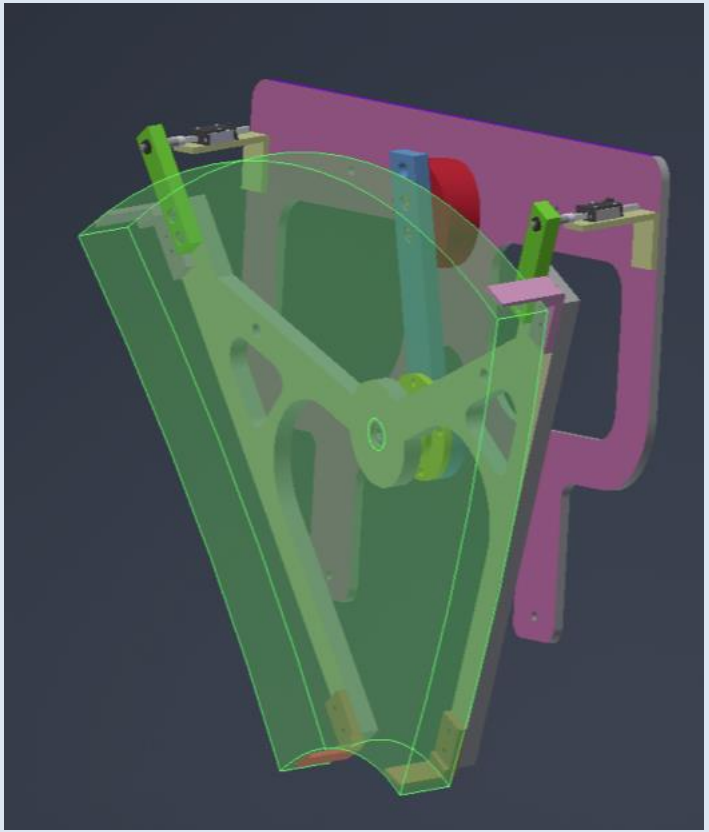
```
Processing from_marco.c...
CentralTrackingRegionP_zmax          1800.00 mm
ForwardPIDRegion_zmin                1800.00 mm
ForwardTOFRegion_length               150.00 mm
ForwardRICHRegion_zmin               1950.00 mm
DRICH_zmin                           1980.00 mm
vesselZmin                           1980.00 mm
---------------------------------------
ForwardPIDRegion_length              1420.00 mm
ForwardRICHRegion_length             1270.00 mm
DRICH_length                         1270.00 mm
vesselLength                         1270.00 mm
vesselZmax                           3250.00 mm
---------------------------------------
DRICH_exit_window_thickness            50.00 mm
mirrorBackplane                        50.00 mm
mirrorThickness                        35.00 mm
mirrorReflective                       85.00 mm
b                                    3165.00 mm
---------------------------------------
sensorSphCenter (Z, X)      (         -566.00,          1834.00) mm
S               (Z, X)      (         1414.00,          1834.00) mm
focus_tune      (Z, X)      (           61.50,           -70.00) mm
focusTune       (Z, X)      (           61.50,           -70.00) mm
F               (Z, X)      (         1475.50,          1834.00) mm

mirrorCenter    (Z, X)      (          961.99,          1150.08) mm
mirrorRadius                         2203.01 mm
---------------------------------------
```

Mechanics applied a rigid shift downstream (required by ePIC), and accounts for realistic window thickness

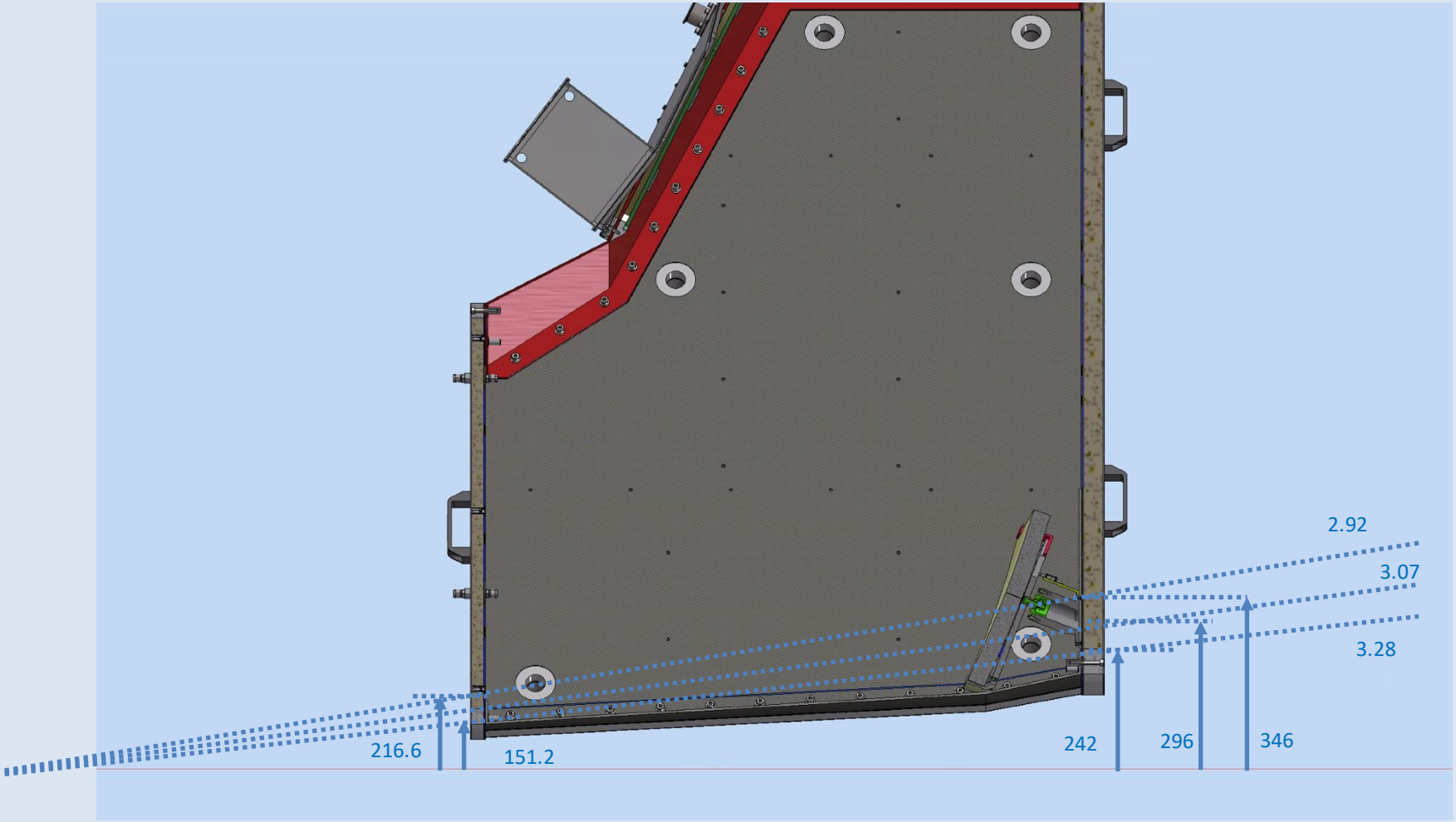
Real-Scale Prototype

Z_C = 939 mm

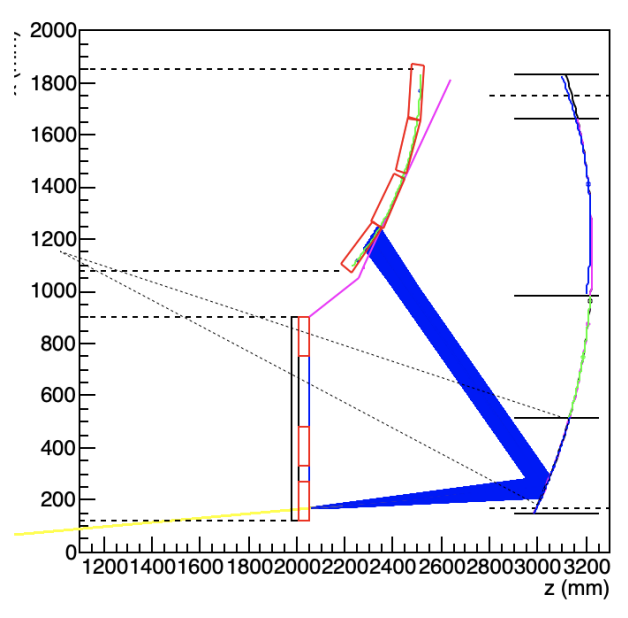
Z_C = 999 mm

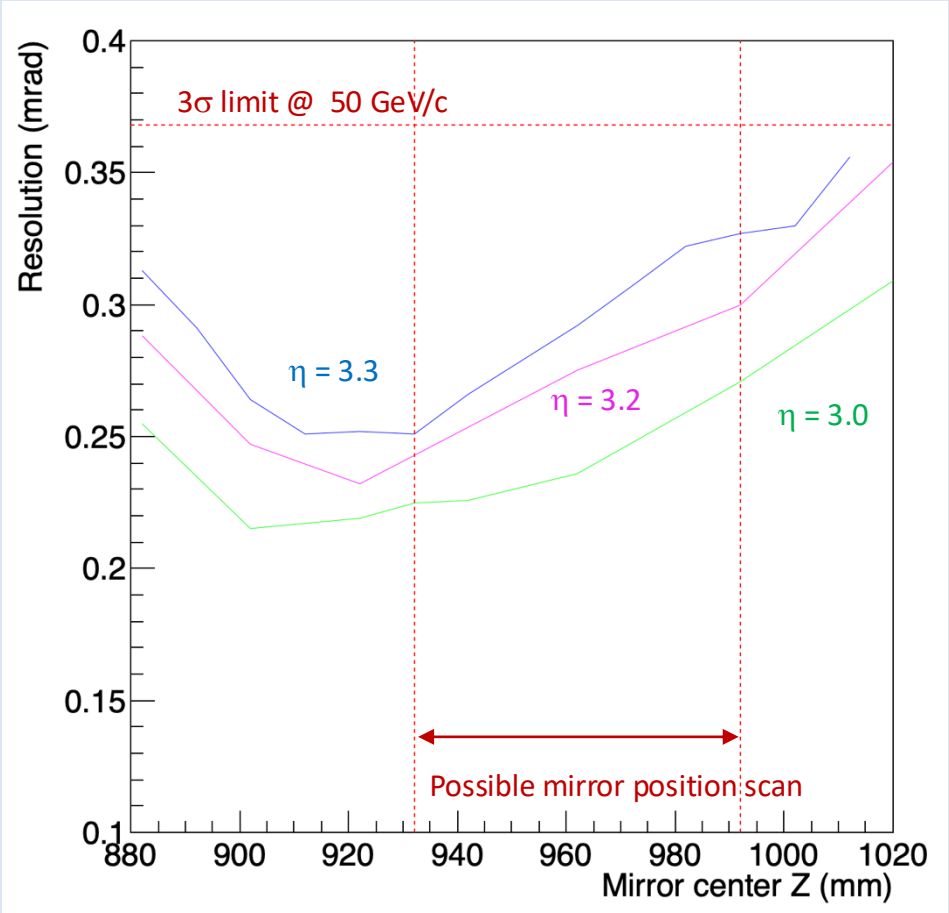


High eta



Optics optimized at η ~ 2.7

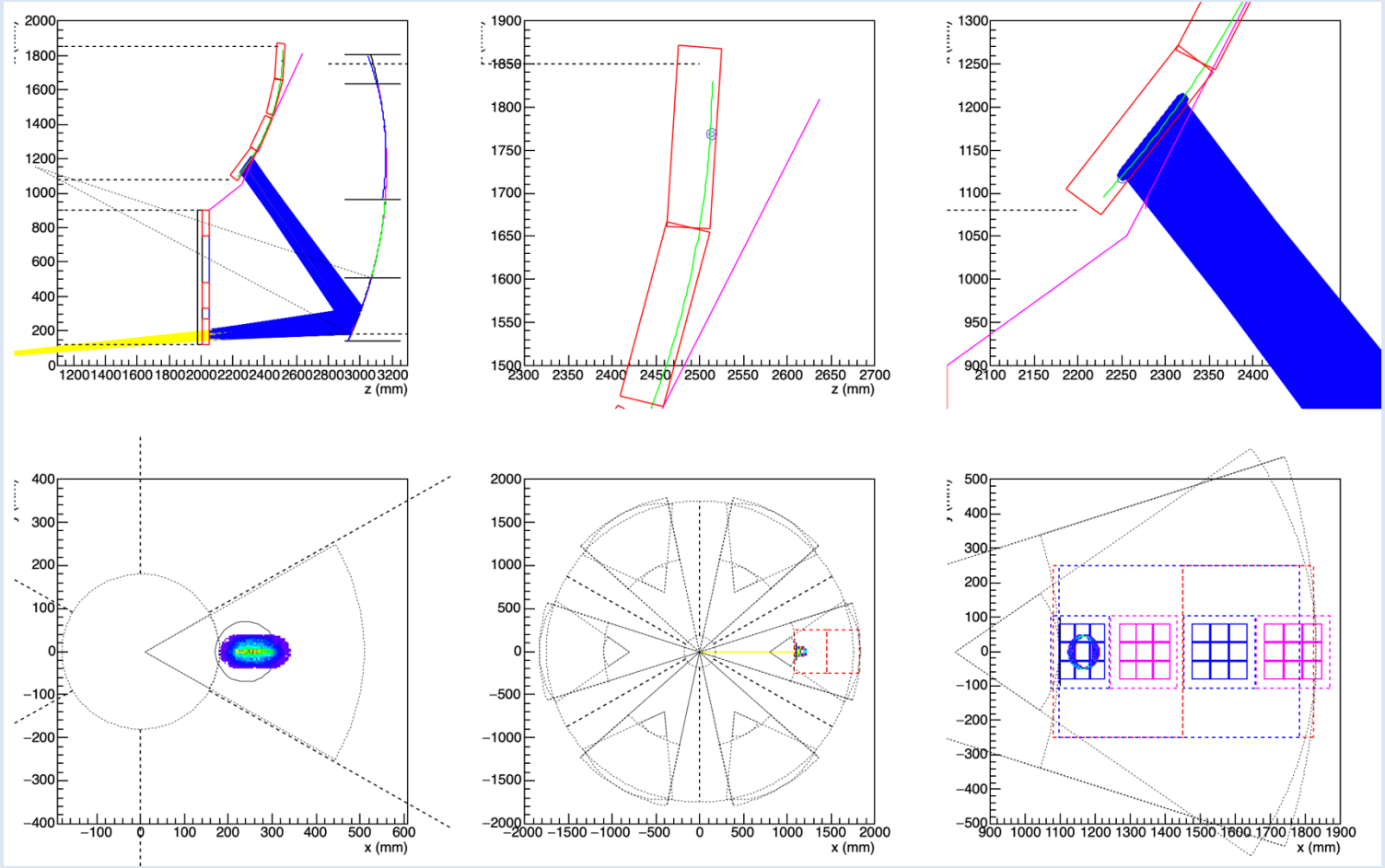




Gas
η ~ 3.00 - 3.30

Mirror
z = 962 mm
h = 180 mm

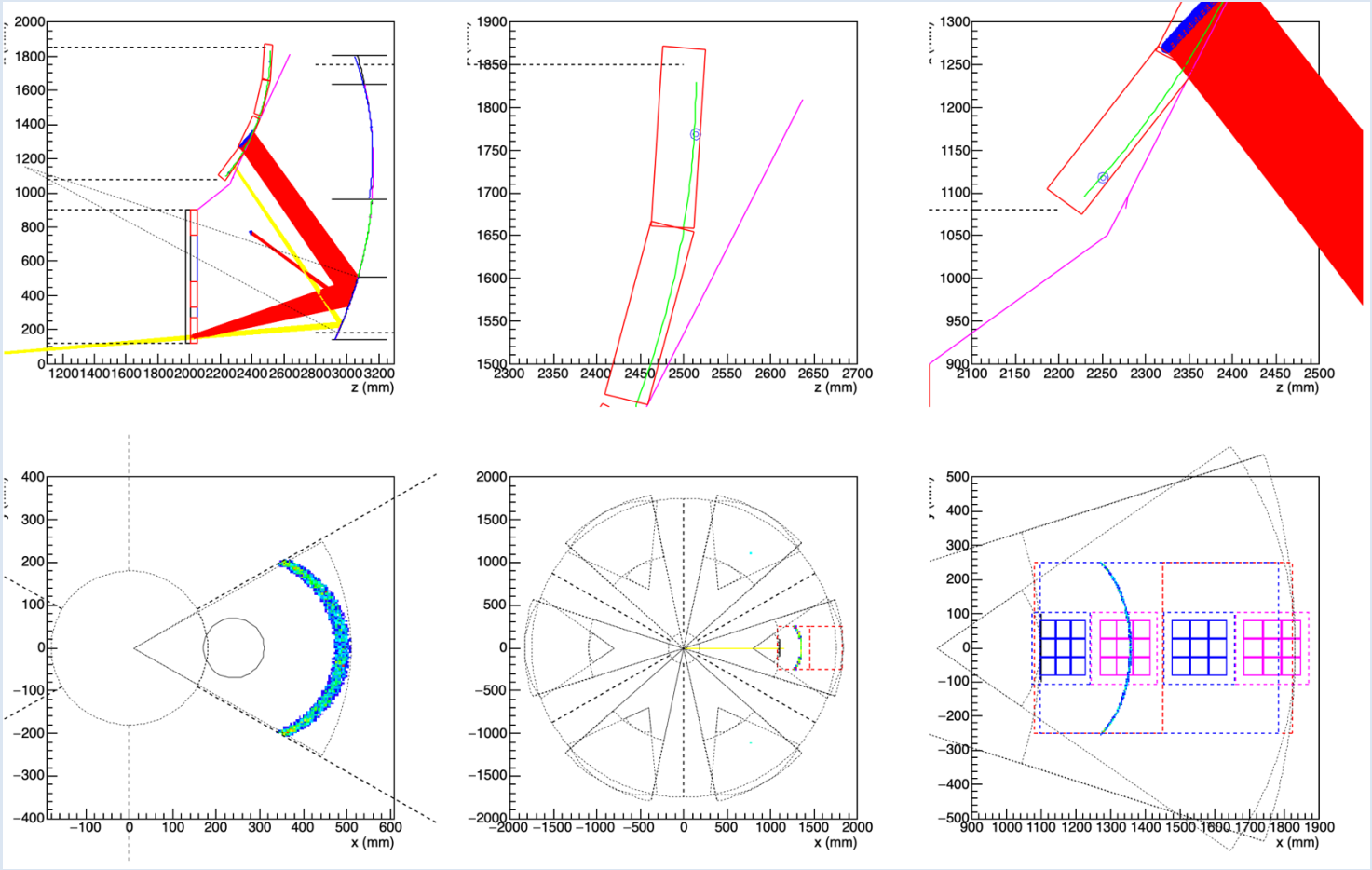
Beam Span
5 cm



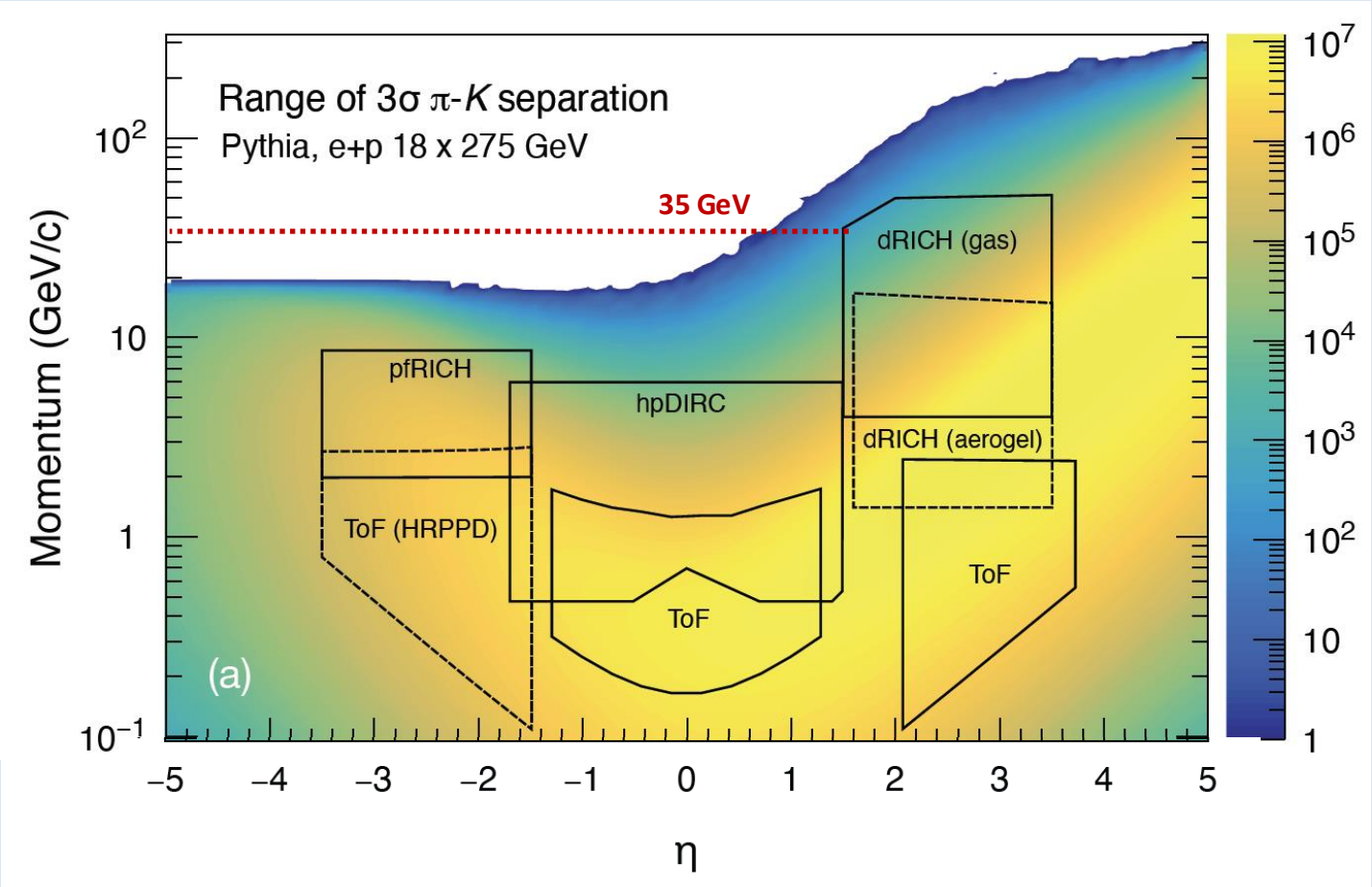
Aerogel
η ~ 3.20 - 3.30

Mirror
z = 962 mm
h = 180 mm

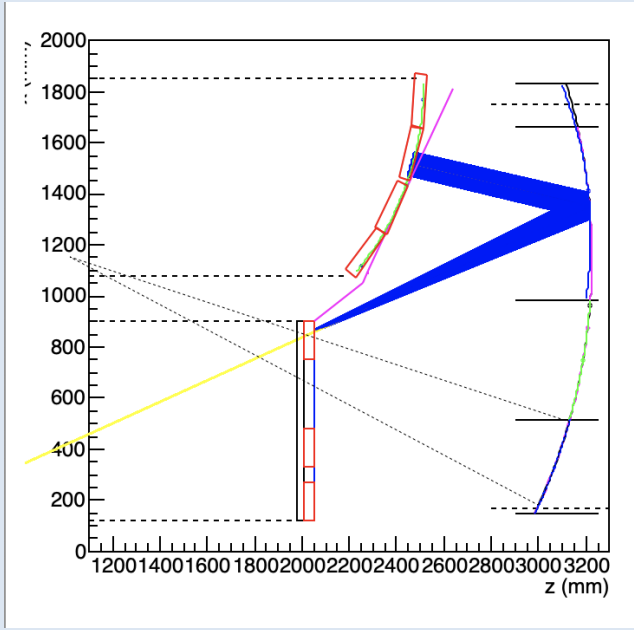
Beam Span
1.5 cm

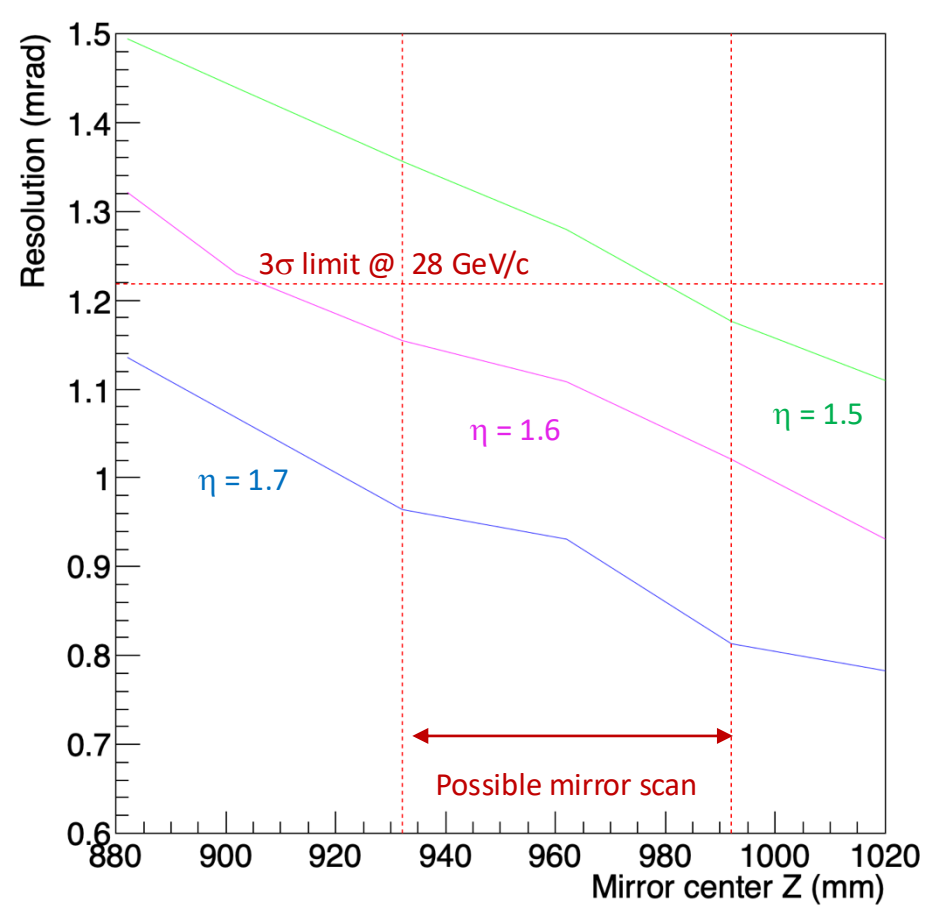


Ranges @ low η


Range of 3σ π-K separation
Pythia, e+p 18 x 275 GeV
35 GeV
dRICH (gas)
pfRICH
hpDIRC
dRICH (aerogel)
ToF (HRPPD)
ToF
ToF
(a)
Momentum (GeV/c)
η

Optics optimized at η ~ 2.7

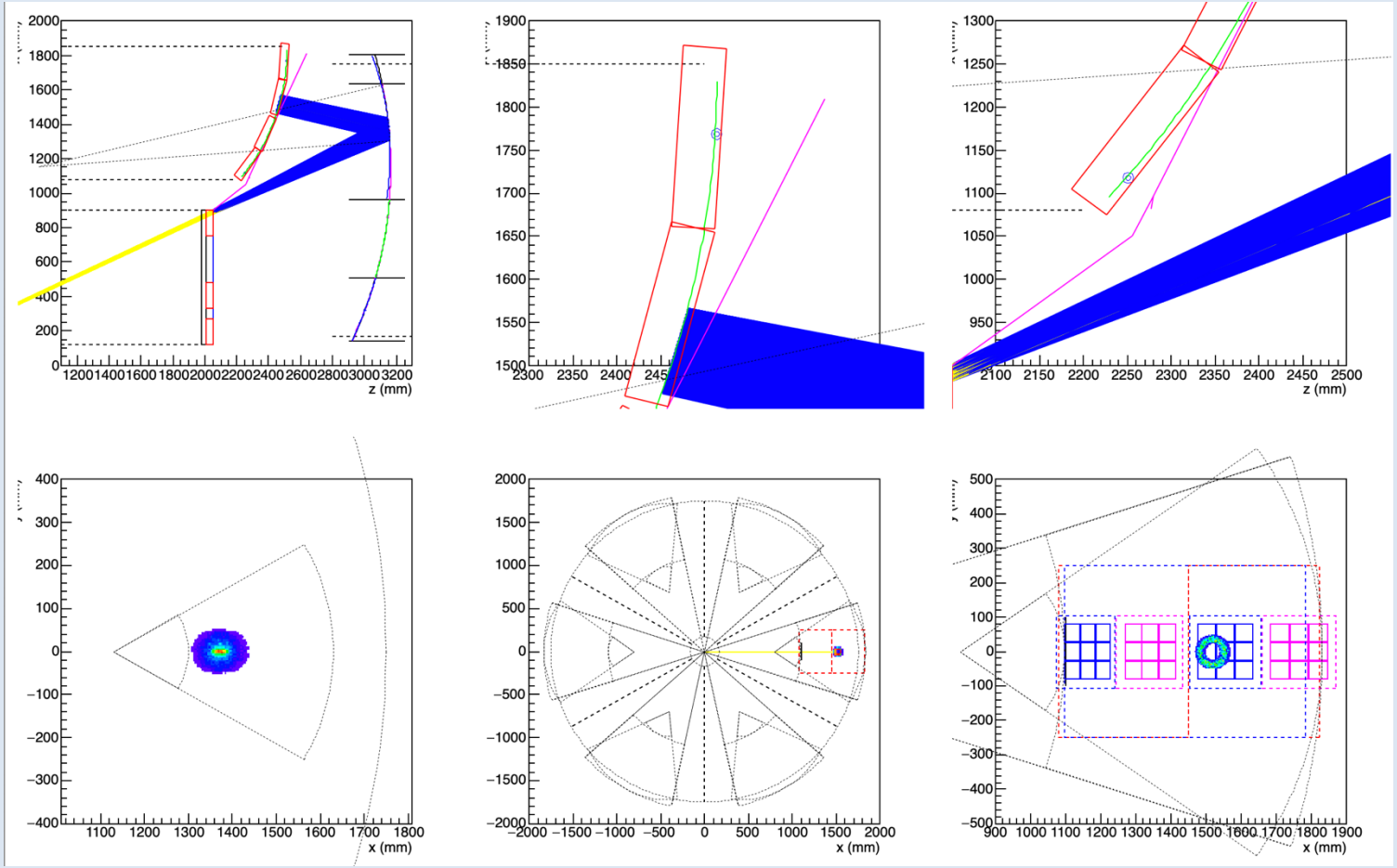




Gas
η ~ 1.56-1.58

Mirror
z = 962 mm
h = 1300 mm

Span
2 cm



Aerogel
η ~ 1.65 - 1.70

Mirror
z = 962 mm
h = 1300 mm

Span
4 cm