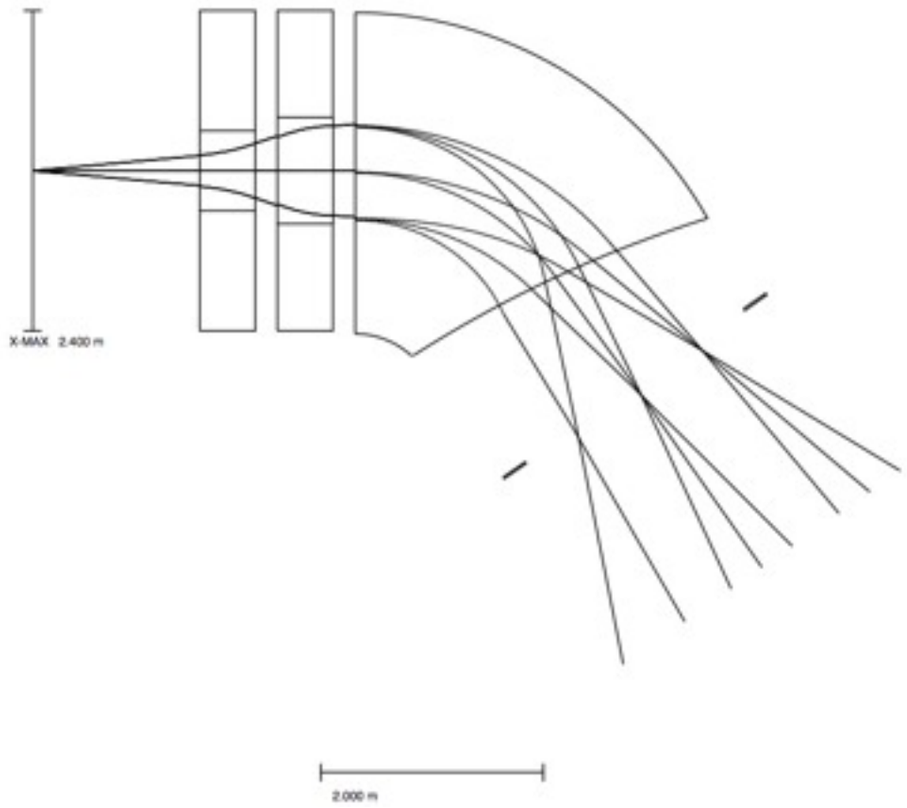
20130402 lab meeting - KYO

: Geant4 Simulation for QD system

[GICOSY_130219]

[top view]

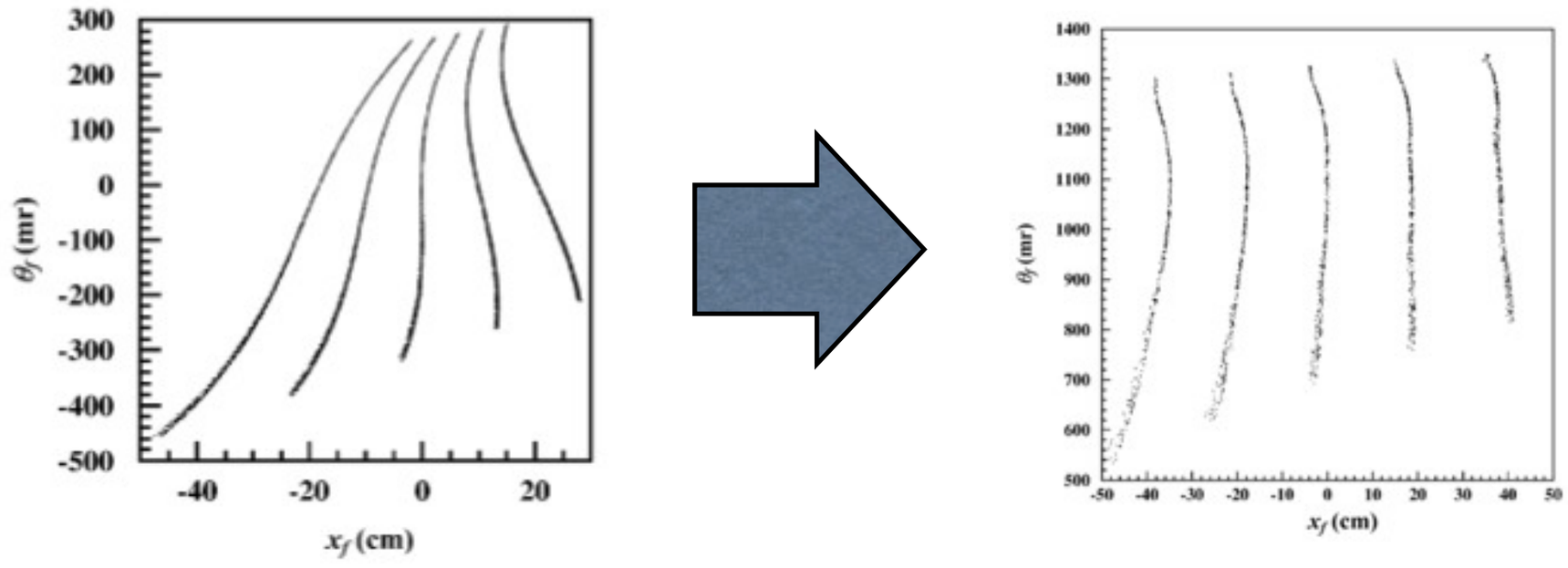


This was <u>1st order calculation</u>
: meaningless
: not valid for large acceptance
: hard to make such a small tilted angle with large p-acceptance

- **GICOSY :** 2nd order calculation $x_j(f) = \sum_k R_{jk} x_k(i) + \sum_{k,l} T_{jkl} x_k(i) x_l(i) + \cdots$
- **K-trace :** higher order
- **Geant4 :** ?? (4th order Runge-Kutta)

[Comments from Dr.Yoon]

1. FPD is not straight => natural phenomena
   : It can be modified to some degree by giving some curvature on dipole surface, but too complicated and hard to make in reality.
   : “Software” correction together
      cf)MAGNEX at INFN-LNS



2. The width of FPD is too wide => need to think

3. <u>Q-D system</u> would be better!

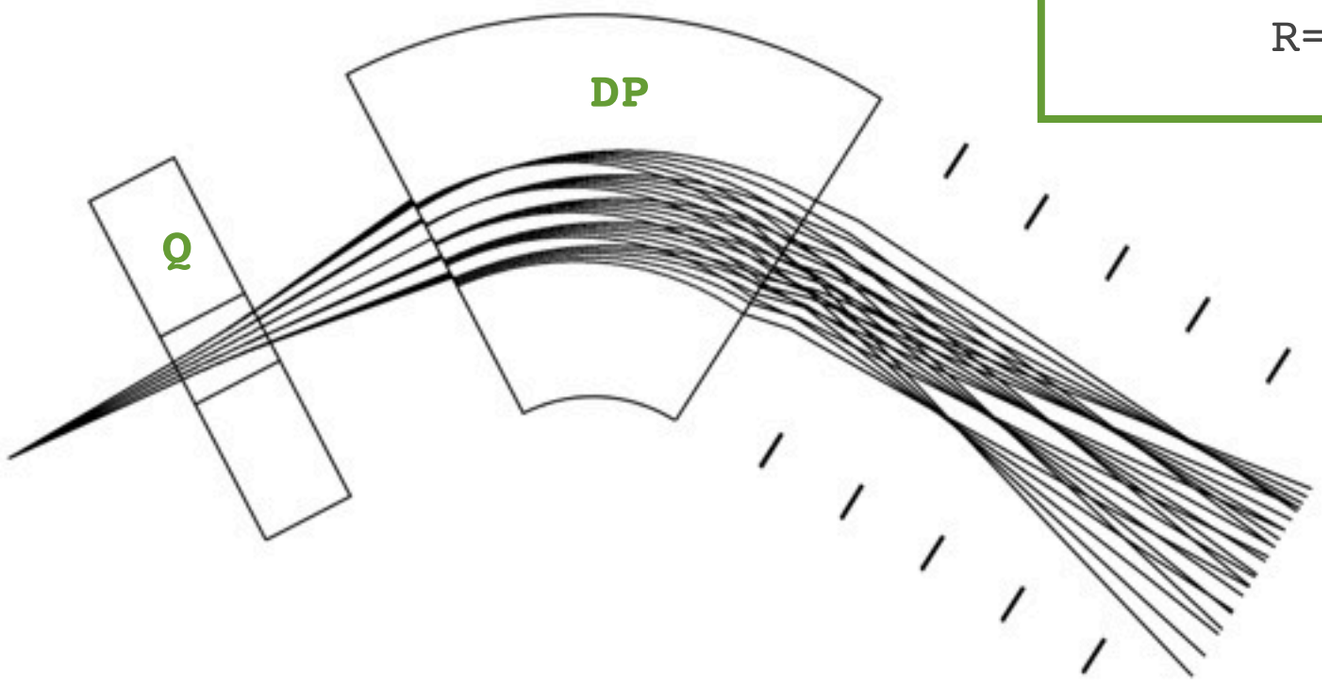
[GICOSY 130401 – QD system]

1.0m ->Q-> 1.0m ->DP-> 0.5m*6 -> C

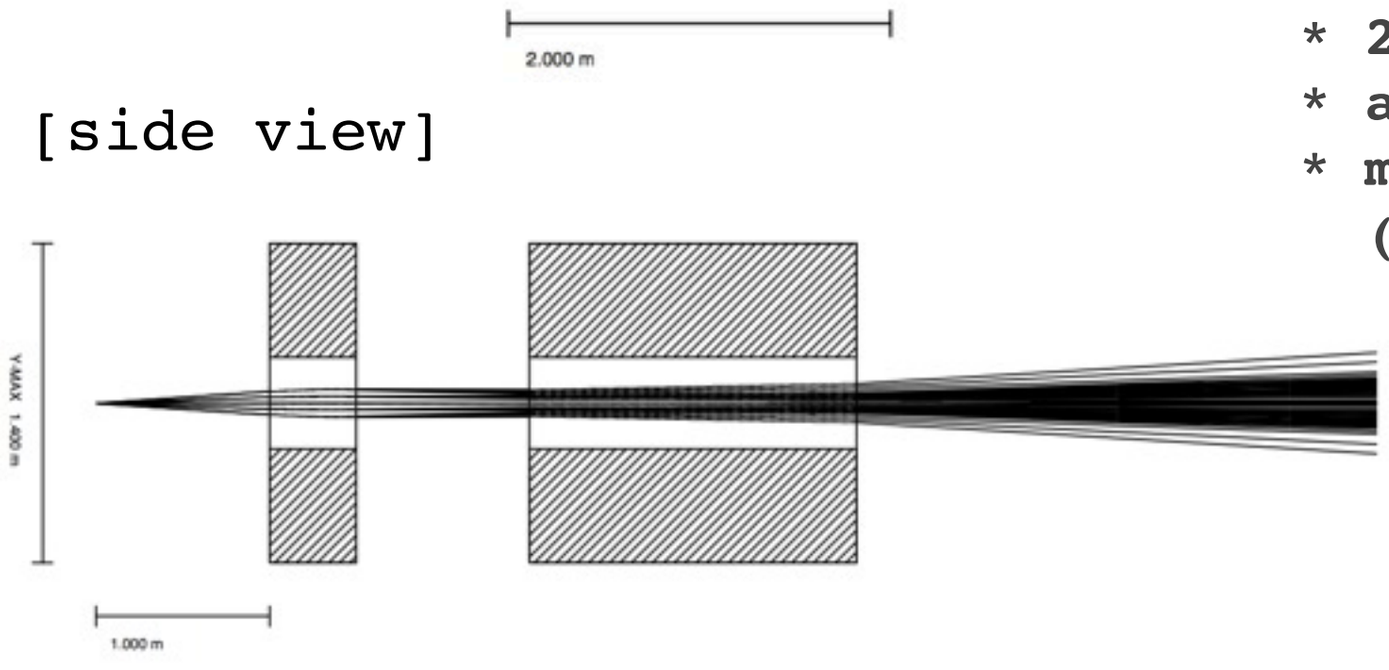
***Q** : L=50cm, full_a=40m, B=-1.42T/m (y-focusing)

***DP** : θ=60°, half_gap=20cm, w1=2m?, w2=2m?,
R=1.8m, B =-0.36T, β_1=-25°, β_2=-25°

[top view]



[side view]



* 2nd order calculation
* angular acceptance = 50mr, 50mr
* momentum Range = ±30%
  (corresponding KE Range ~ ±58%)

[Geant4]

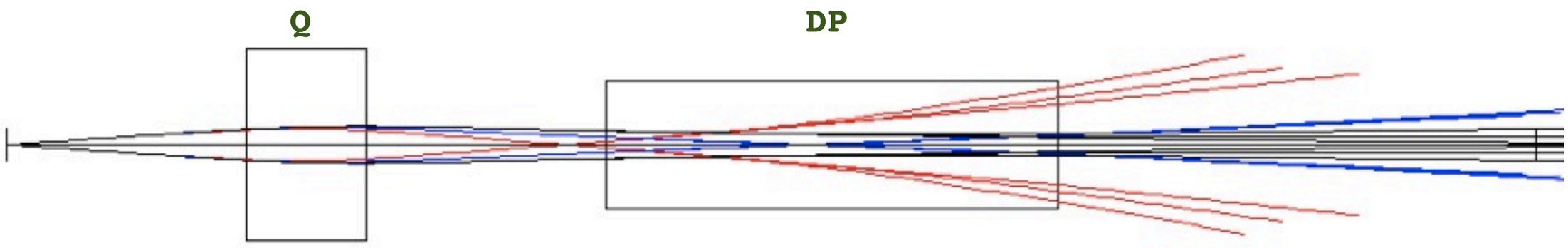
*** Some data on server was lost!!**

=> Lost files can not be recovered.
=> Genie is storing remaining files by back-up
=> He is thinking of enhancing the back-up system
=> More details : Genie & Yeonju

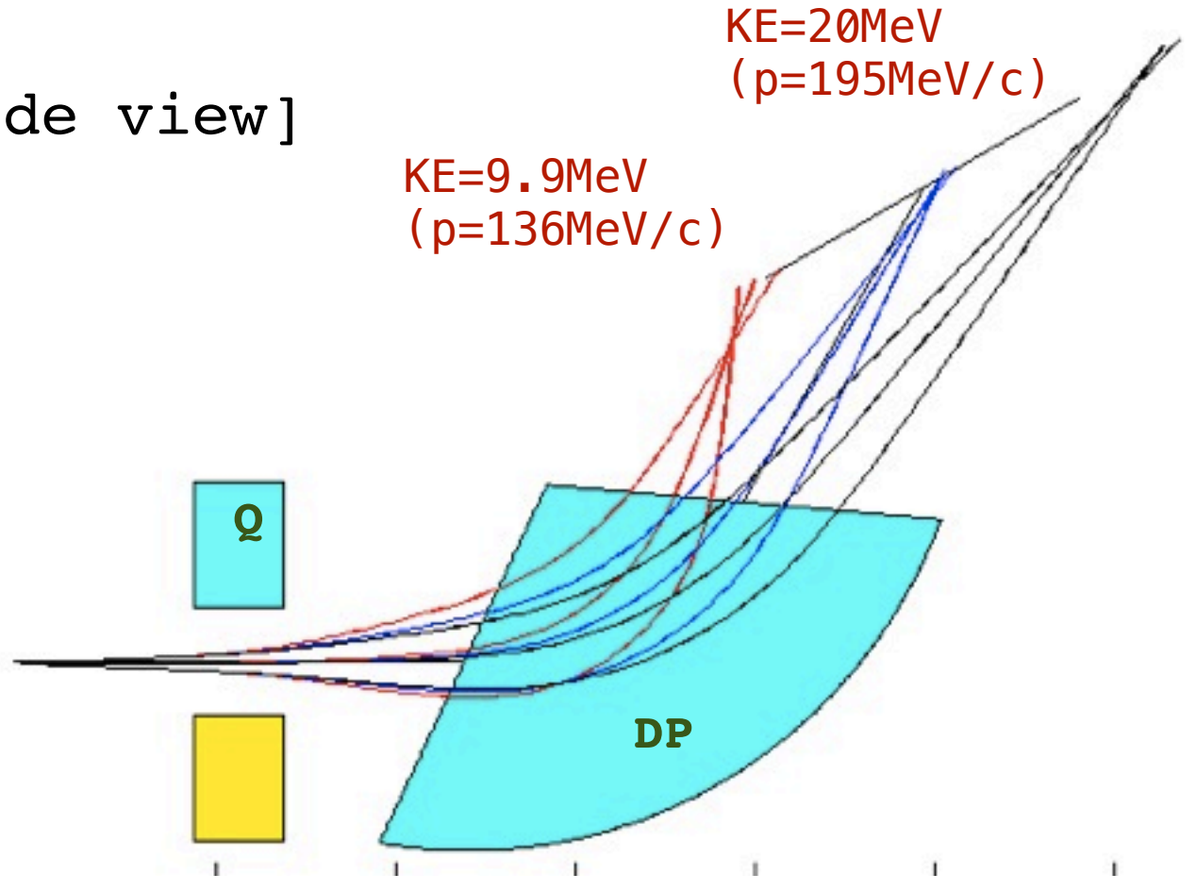
* I'll continue to work on this right after the back-up, but I'm afraid it might take time to make some codes again..

[K-trace]

[top view]



[side view]



* need to discuss more with Dr. Yoon ..

Back up slides

[GICOSY_130219]

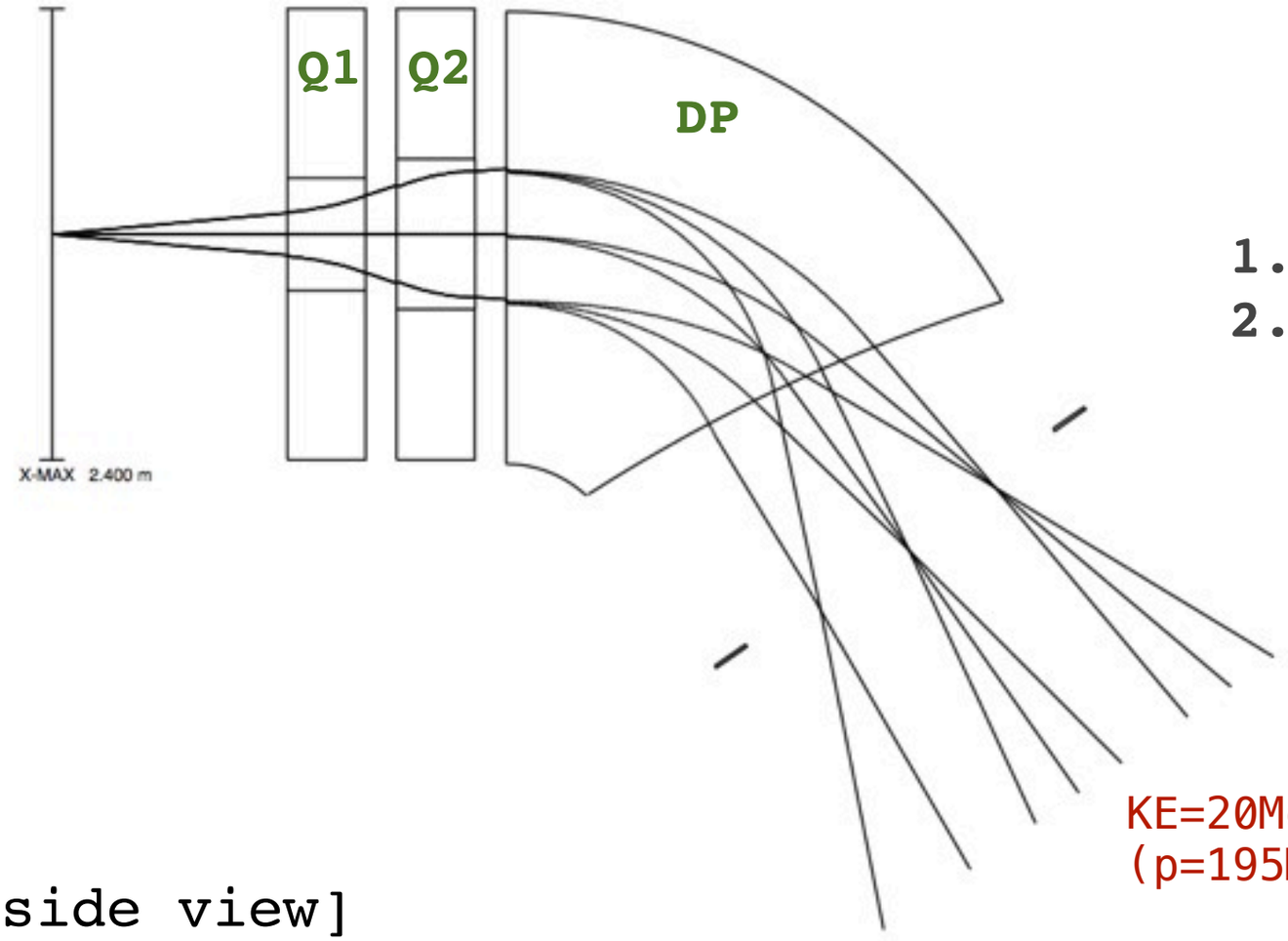
1.5m ->Q1-> 0.2m ->Q2-> 0.2m ->DP-> 1m -> C

*Q1 : L=50cm, full_a=60cm, B=-2.14T/m (y-focusing)

*Q1 : L=50cm, full_a=80cm, B=+1.37T/m (x-focusing)

*DP : θ=55°,half_gap=20cm, w1=2.4m, w2=2.4m,
R=2.2m, B =-0.29T, β_1=0°, β_2=10°
exit curvature radius = 11m

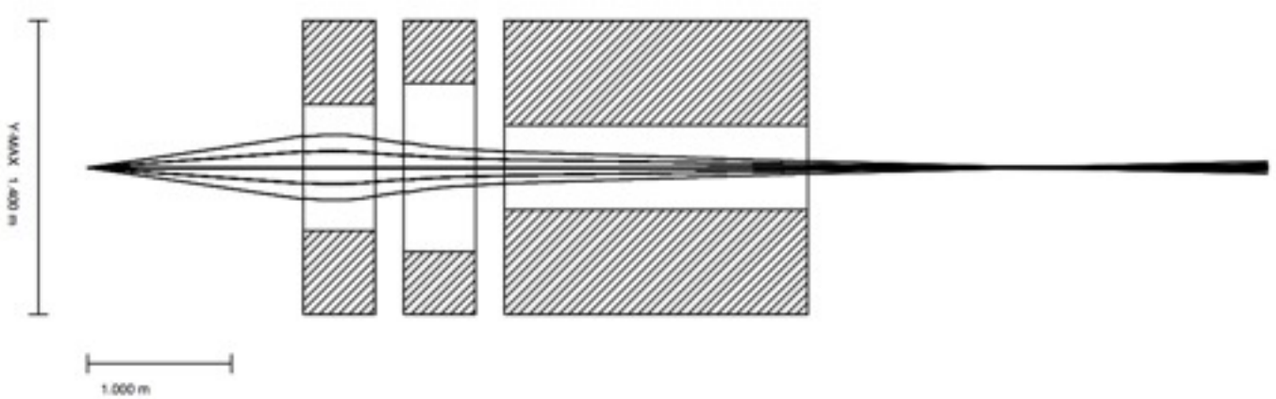
[top view]



KE=20MeV
(p=195MeV/c)

1. **angular acceptance = 75mr, 100mr**
2. **momentum range = ± 30%**

[side view]



[GICOSY 130312]

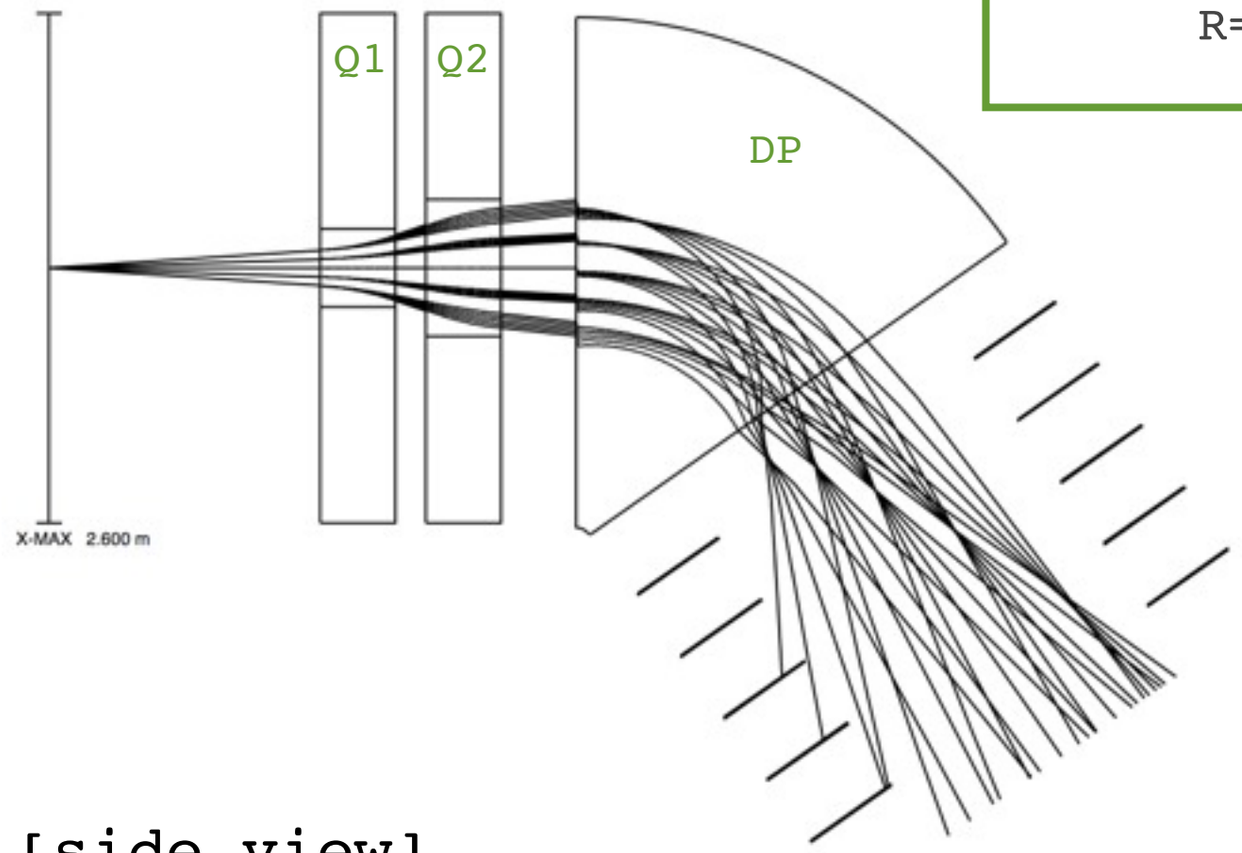
1.8m ->Q1-> 0.2m ->Q2-> 0.5m ->DP-> 0.8m*5 -> C

***Q1** : L=50cm, full_a=40cm, B=-1.88/m (y-focusing)

***Q2** : L=50cm, full_a=70cm, B=+0.81T/m (x-focusing)

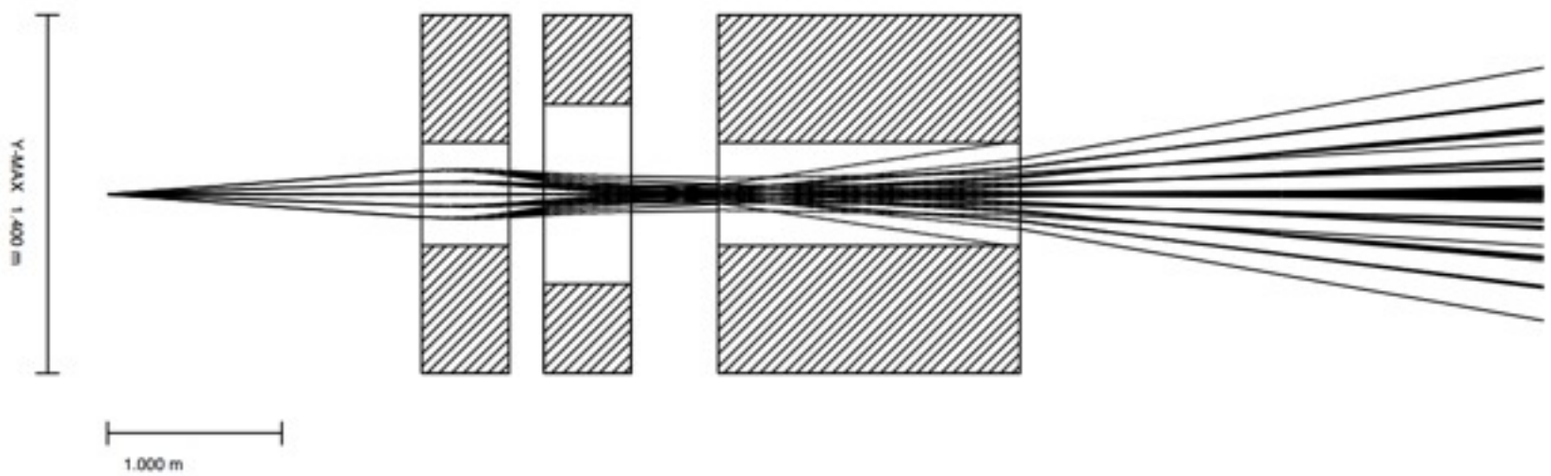
***DP** : θ=55°, half_gap=20cm, w1=2.6m, w2=2.6m,
R=1.8m, B =-0.36T, β_1=-25°, β_2=-25°

[top view]

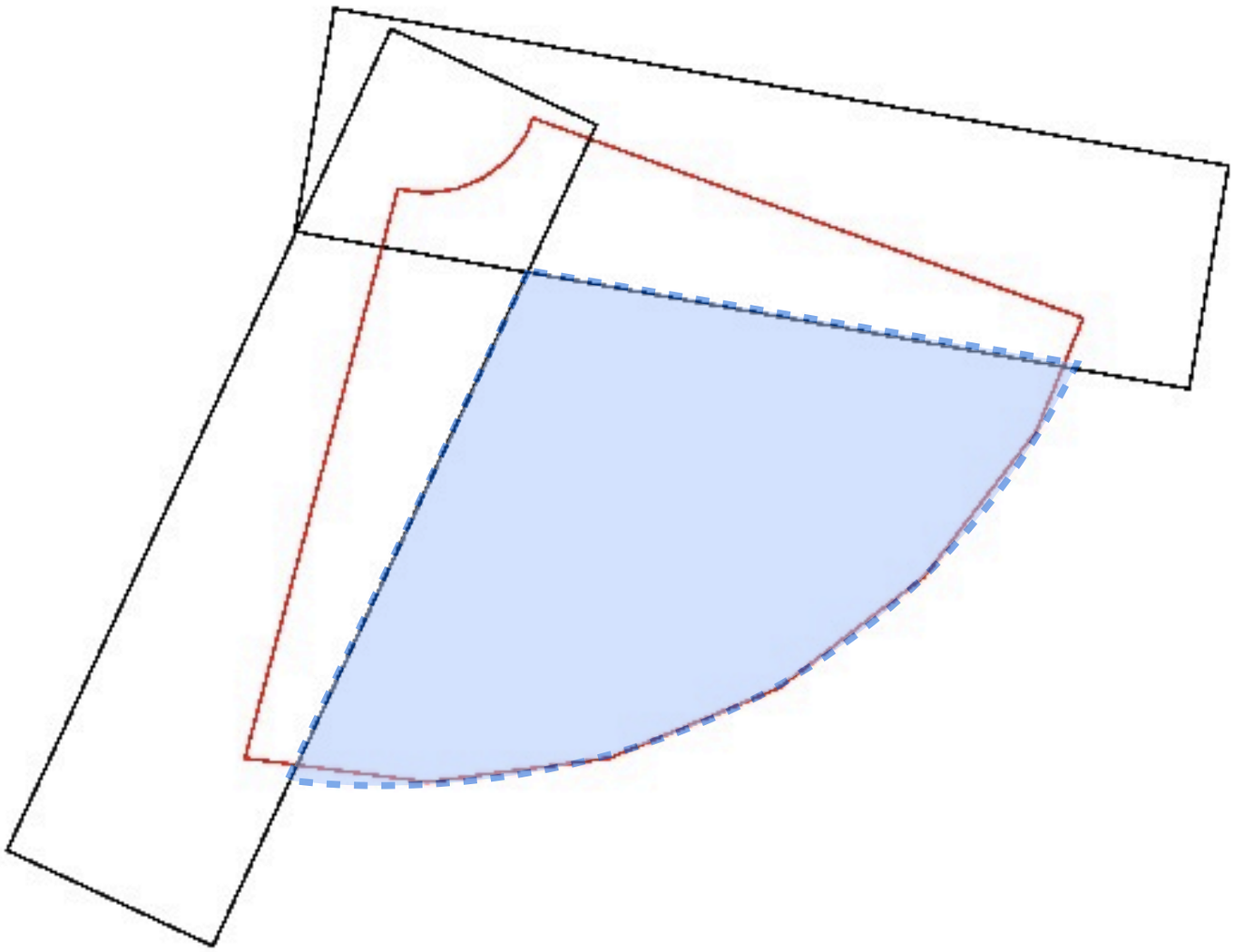


1. angular acceptance = 50mr, 50mr
2. momentum Range = ±30%
   (corresponding KE Range ~ ±58%)

[side view]

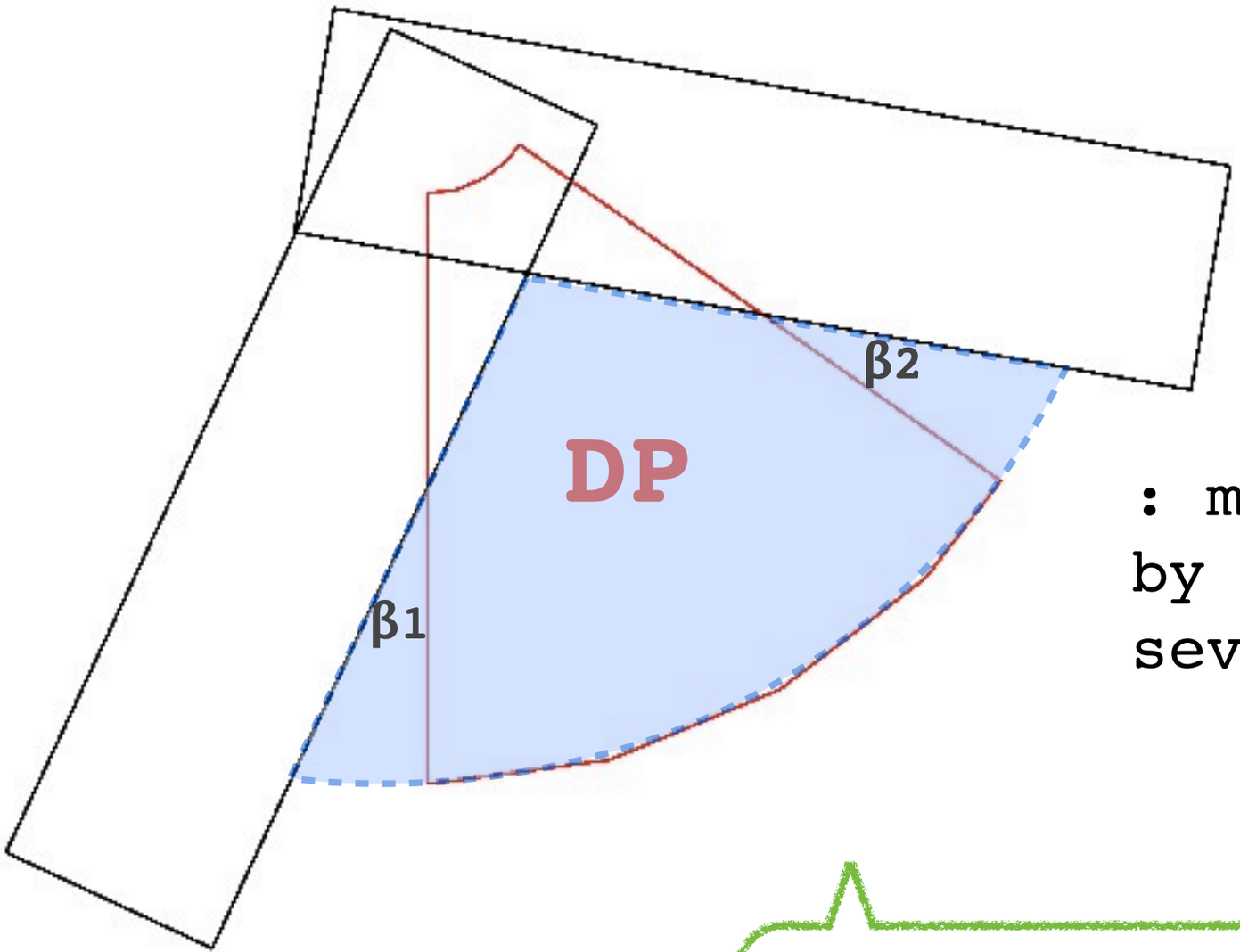


- DP 시작점 -15도. 총앵글 +30한거

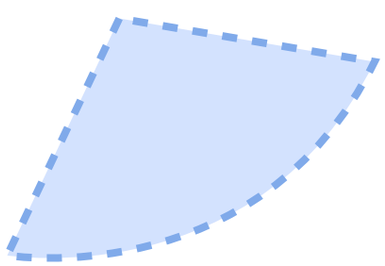


[SHIM ANGLE in Geant4]

- **shim angle β1=25°, β2=25°**

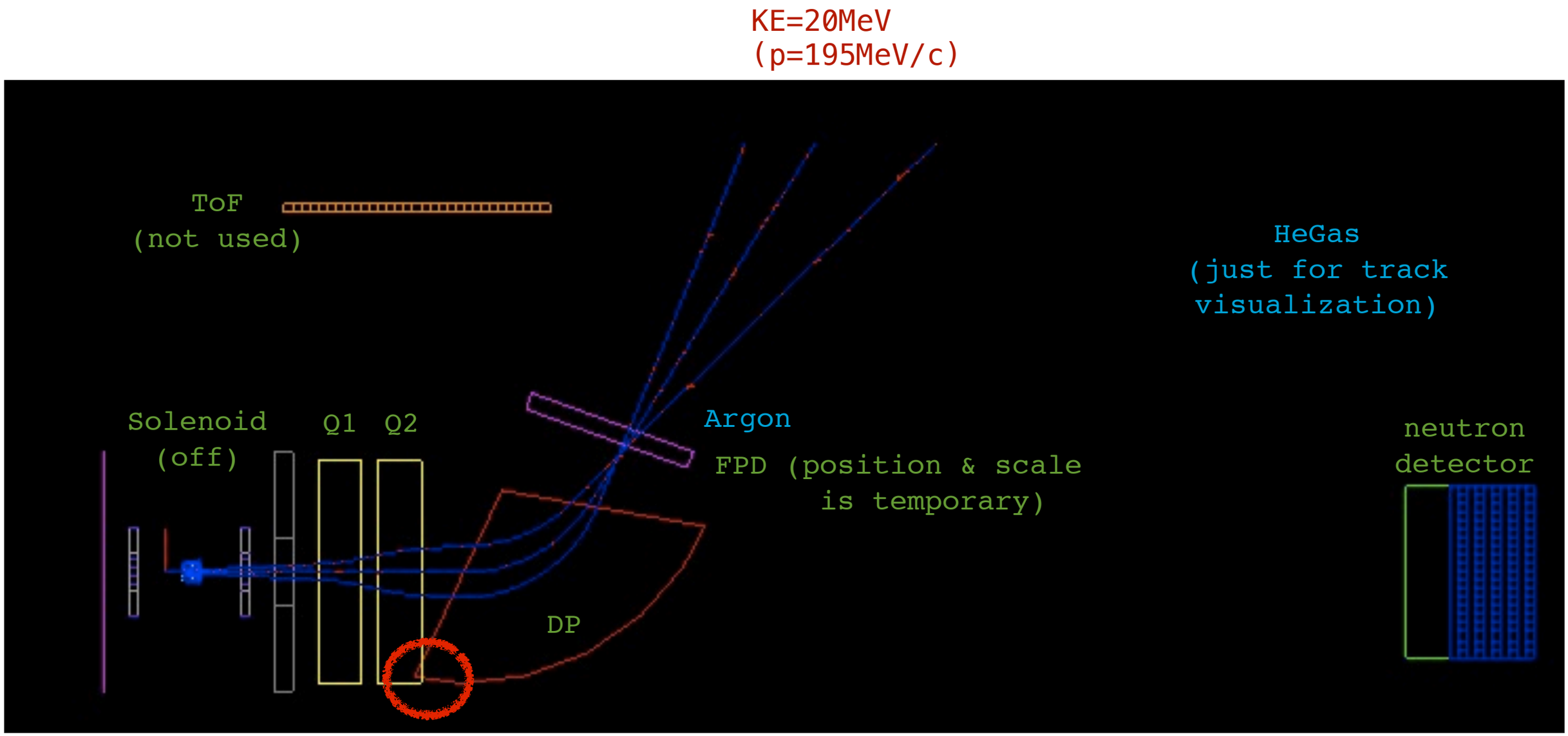


: make the real volume
by unifying or subtracting
several dummy volumes( )



Is this the dipole shape that we are going to make?

[Geant4 : whole Configuration]

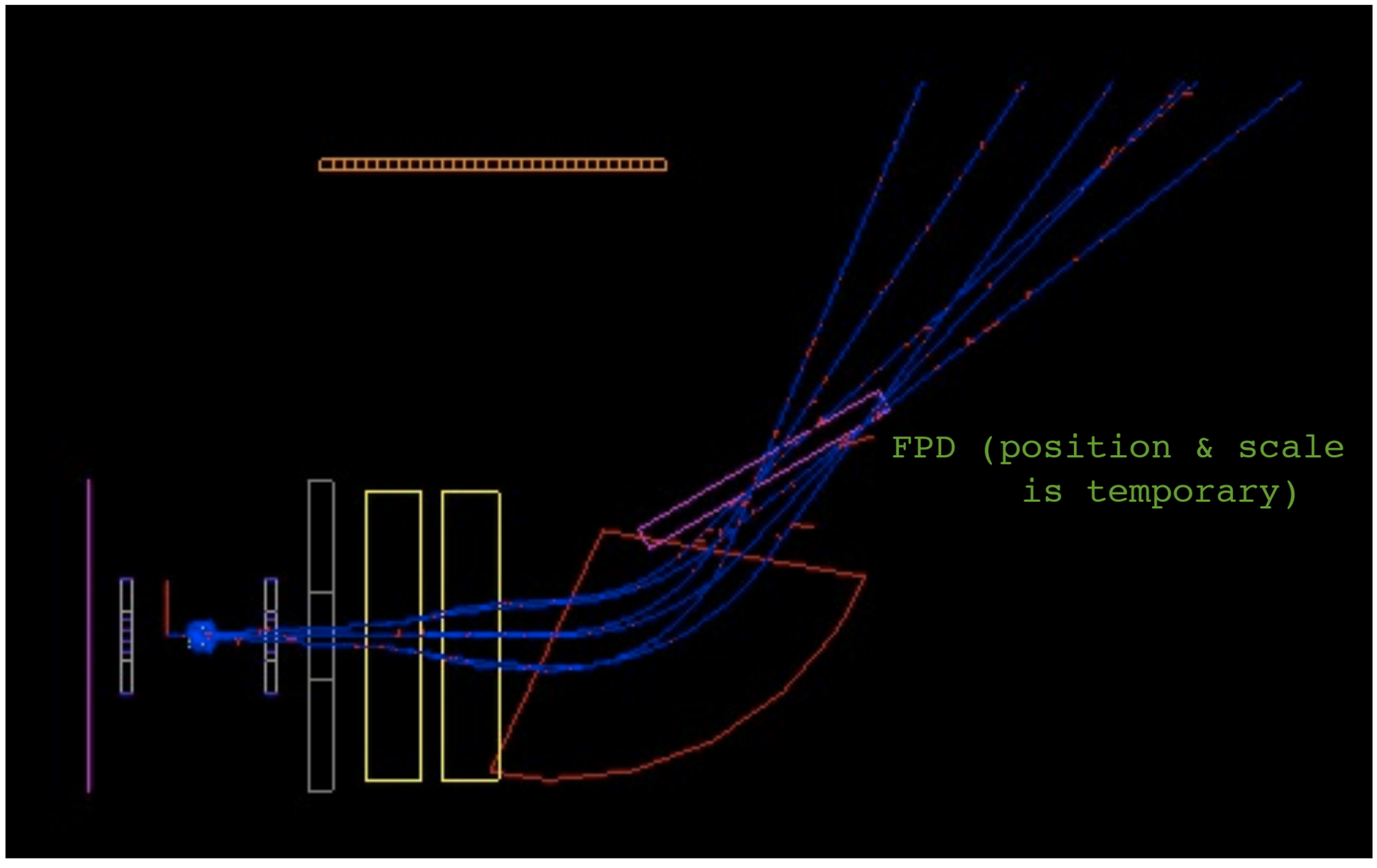


overlapped!

[Simulation – example]

KE=20 MeV (p=195MeV/c)

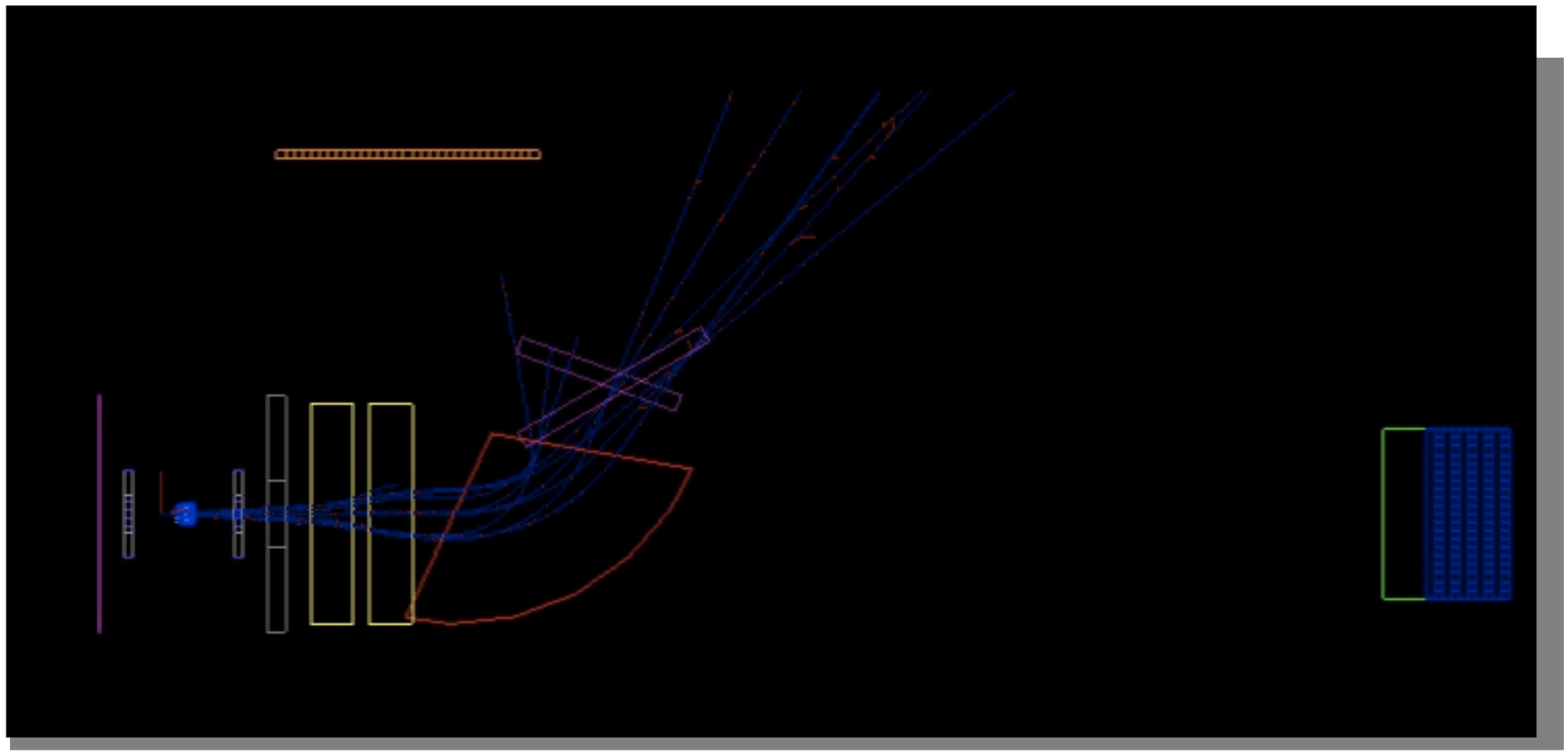
KE=33.6 MeV (p=253MeV/c)



: 윤종철박사님 is calculating the exact position of FPD
: temporary - width =2.5m, height = 0.5m, thickness = 0.2m
- tilted angle ≃ 40deg

Field => beta_1=25, beta_2=25 일 때 (그림에도 넣음)

KE=9.86MeV (p=136.36MeV/c)　KE=20MeV (p=194.8MeV/c)　KE=33.56MeV (p=253.24MeV/c)



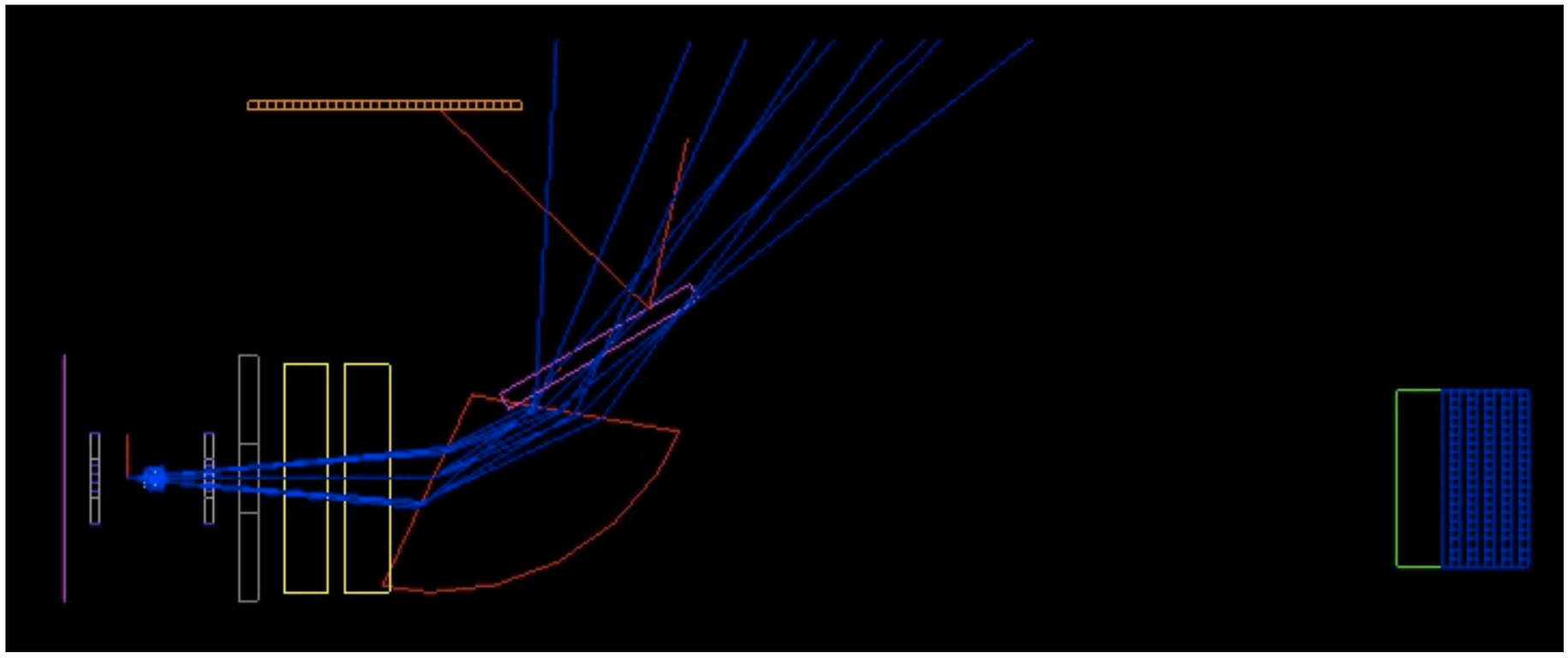
진공에서 해본거

Field => beta_1=25, beta_2=25 일 때 (그림에도 넣음)

: FPD도달은 하지만 그래도 low p는 dipole 안에 focal pnt 잡히는 듯..

: field mapping을 하면 좀 더 정확하기는 할 것 같다

KE=9.86MeV (p=136.36MeV/c)　KE=20MeV (p=194.8MeV/c)　KE=33.56MeV (p=253.24MeV/c)



[Future plans]

1. Study the 2nd order calculation
   & how to handle the vertical information

2. Same plans with the last meeting
   - Determine the position of FPD precisely
   - Simulation for position information
     (with different KE with given angular acceptance)
   - Apply the intrinsic resolution of detector
   - momentum information reconstruction
     & check the momentum resolution

NEXT?
: Event Simulation with IQMD?
: acceptance plot (pT vs y) for the whole LAMPS
: more realistic design for FPD (e.q. layers..)
: Put ToF Wall at the end of FPD