# <Dipole Magnet Design>

2012.11.05 LAMPS Meeting
Korea Univ. Nuclear Physics Lab.
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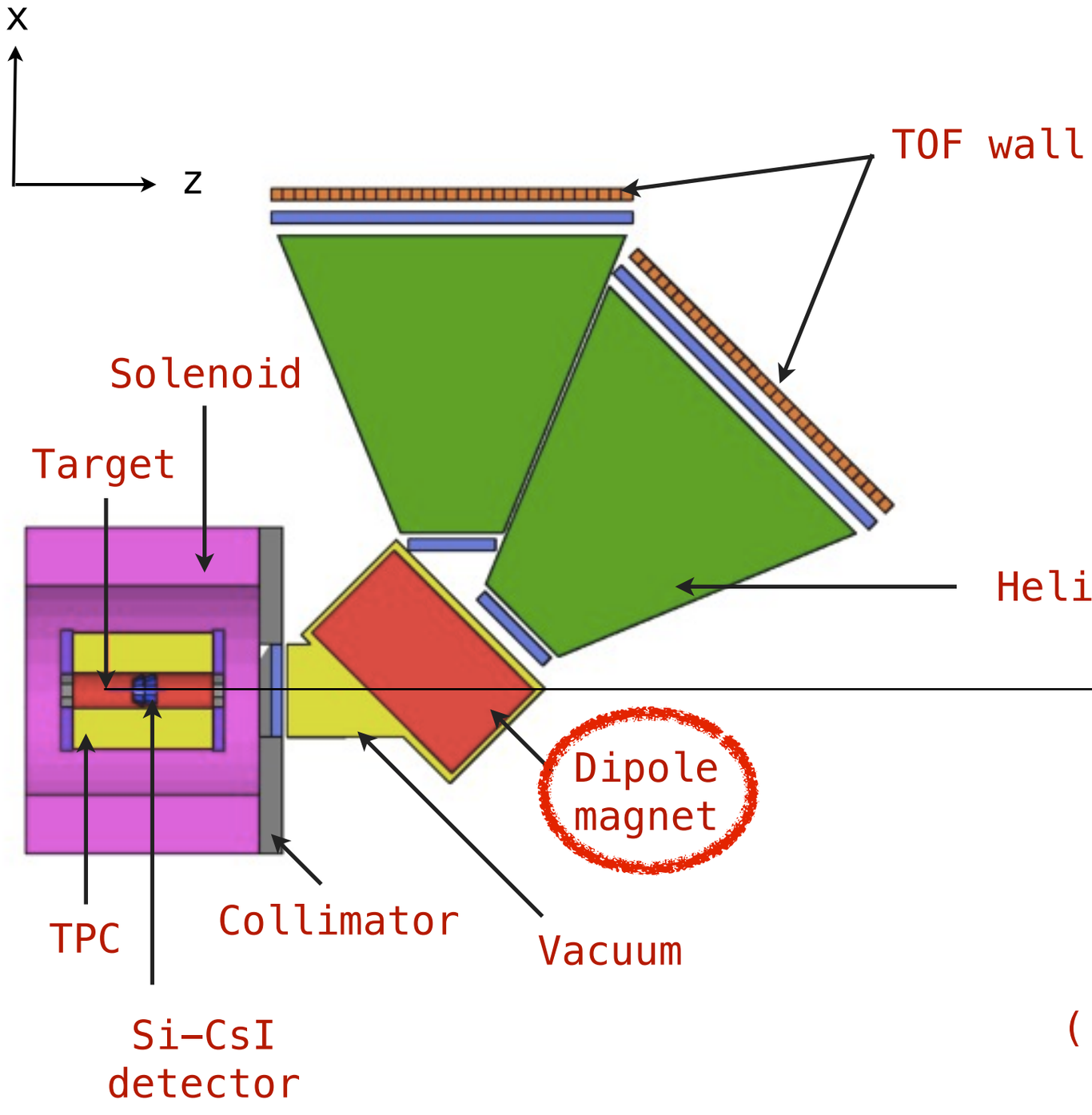
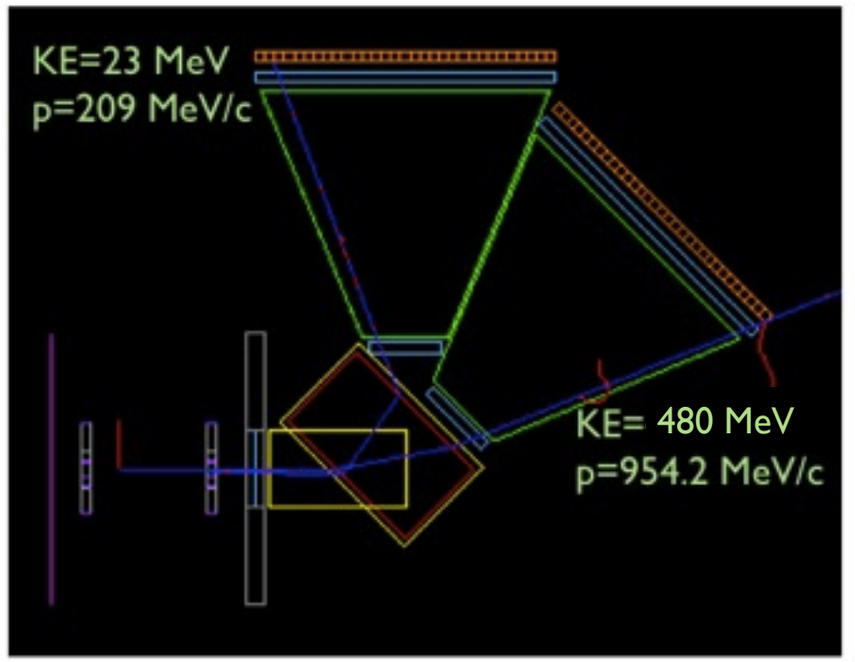
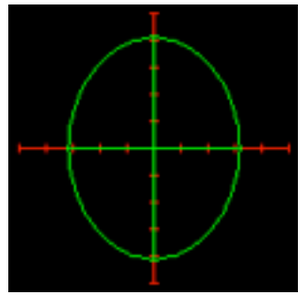
# [ Current design of LAMPS$_H$ ]



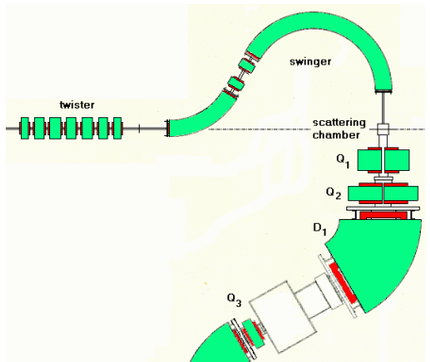
# [ Simulation Programs & References ]



**1) TRANSPORT**

http://aea.web.psi.ch/Urs_Rohrer/MyWeb/trans.htm

: 1st & 2nd order matrix multiplication computer program for the design of static-magnetic beam transport system.




**2) K-trace program**

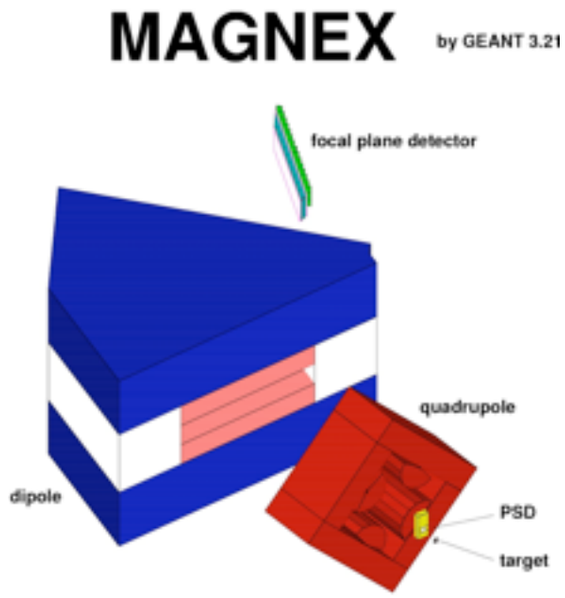
http://www.ne.jp/asahi/kato/jsa/magnet/magnet.html

: Simulation program - Magnetic spectrometer for nuclear reaction experiments

**3) MAGNEX spectrometer**

http://www.lns.infn.it/magnex/magnex.htm

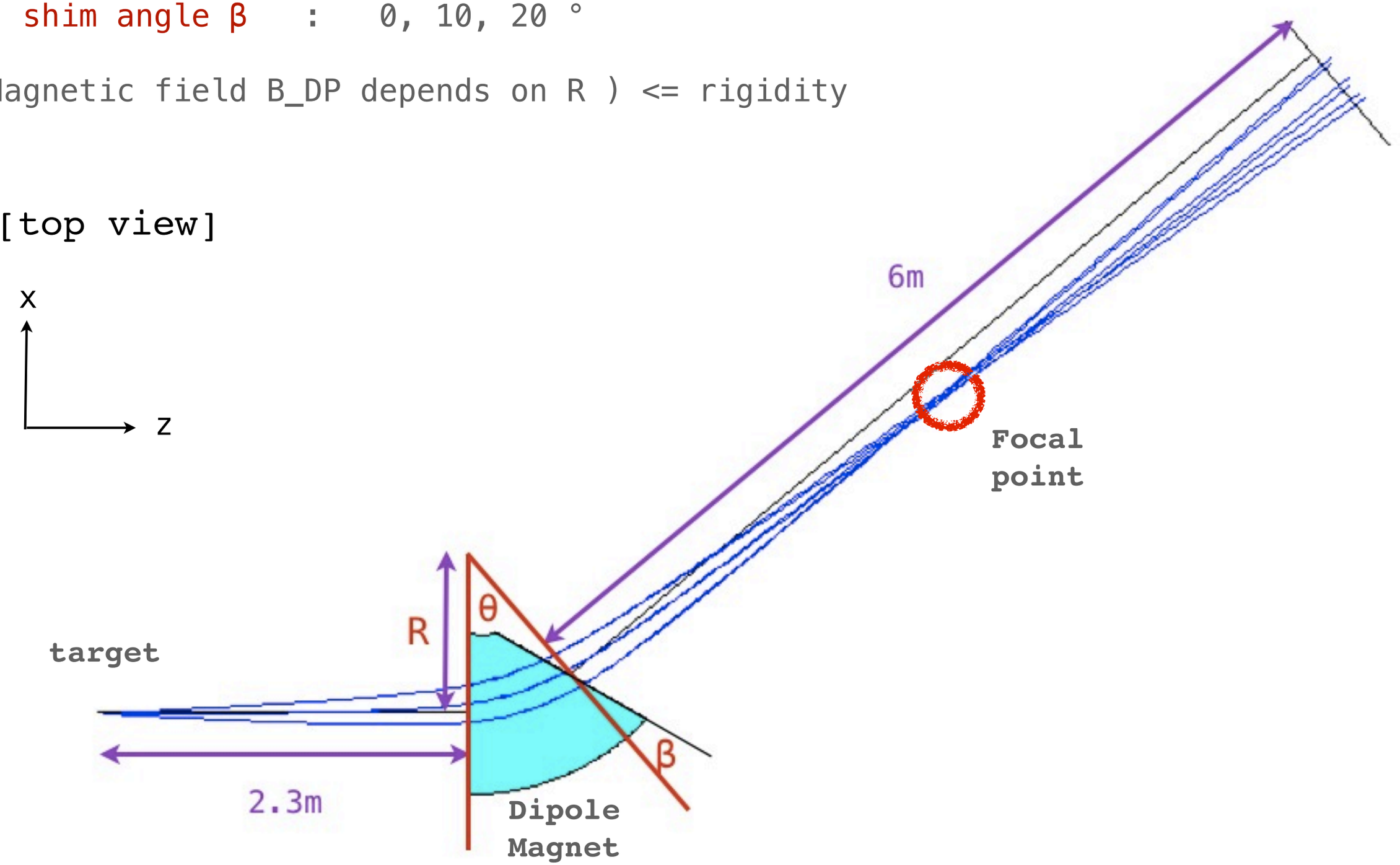
: A large acceptance MAGNetic spectrometer for EXcyt beams.
: INFN - Laboratori Nazionali del Sud, Catania, Italy
: Study of nuclear structure and reaction dynamics



# [ Scale and Parameters ]

< Parameters >
1) central radius R : 1.0, 1.5, 2.0 m
2) deflection angle θ : 30, 40, 50, 60 °
3) shim angle β : 0, 10, 20 °

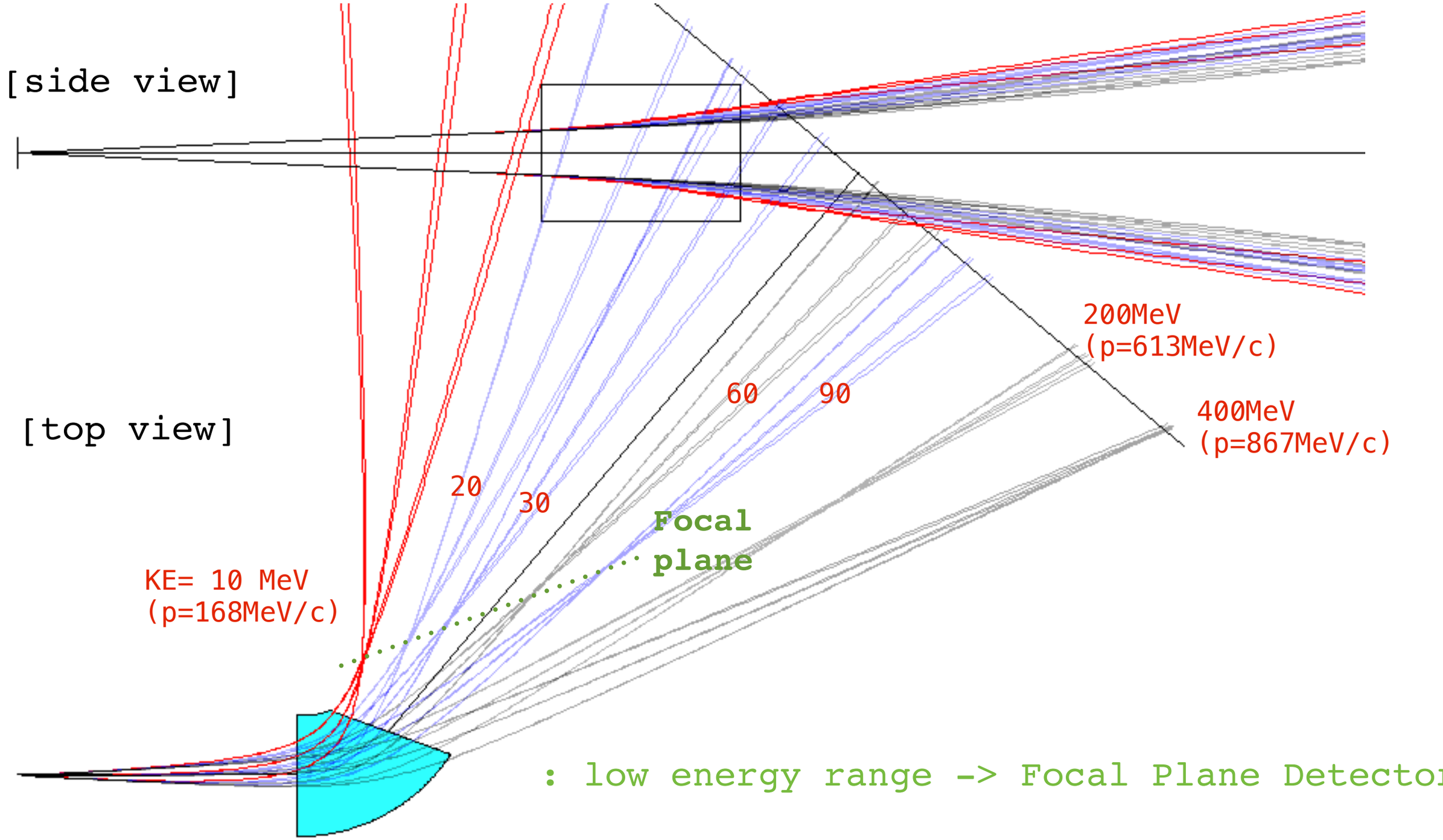
(Magnetic field B_DP depends on R ) <= rigidity



# [ Dipole magnet system]

: R=1.0m,  B_DP = 1.0T,  β=20°,  θ=50°

: energy range of proton : 10 - 400 MeV

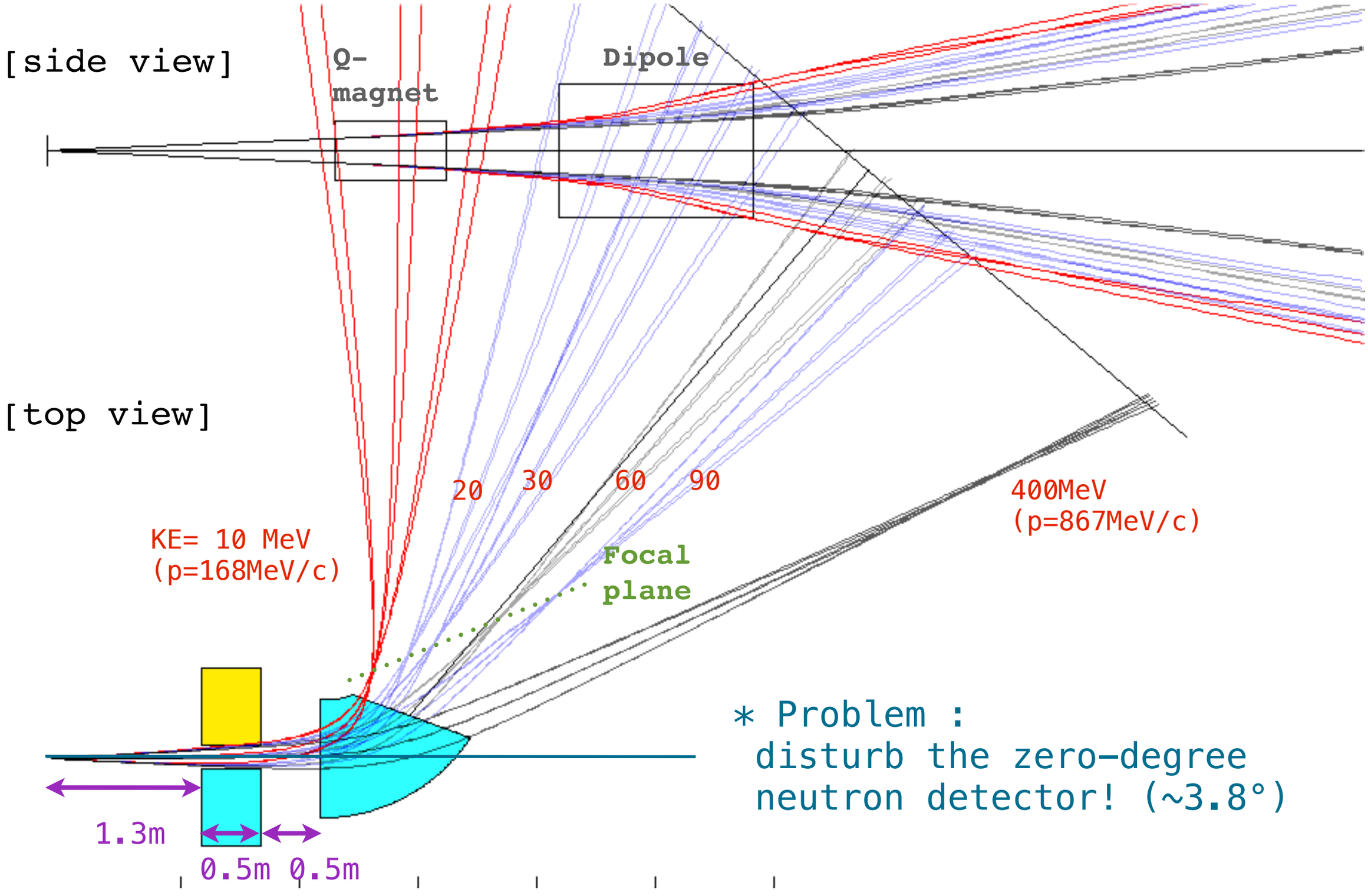



: low energy range -> Focal Plane Detector

# [ QD-system ]

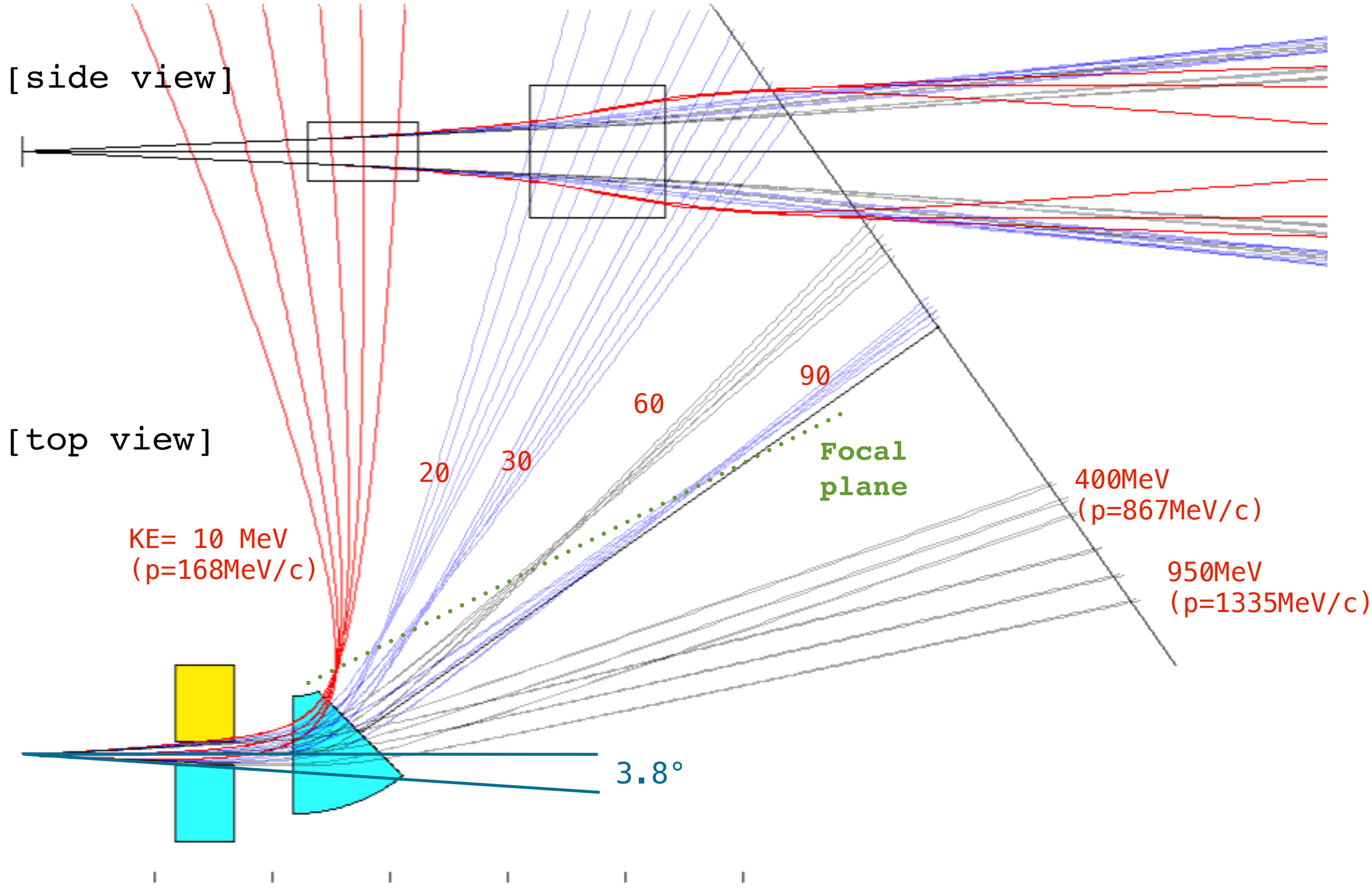
: R=1.0m,  B_DP = 1.4T,  β=20°,  θ=50°  B_Q = 0.5T/m (x-focusing)

: energy range of proton : 10 - 400 MeV

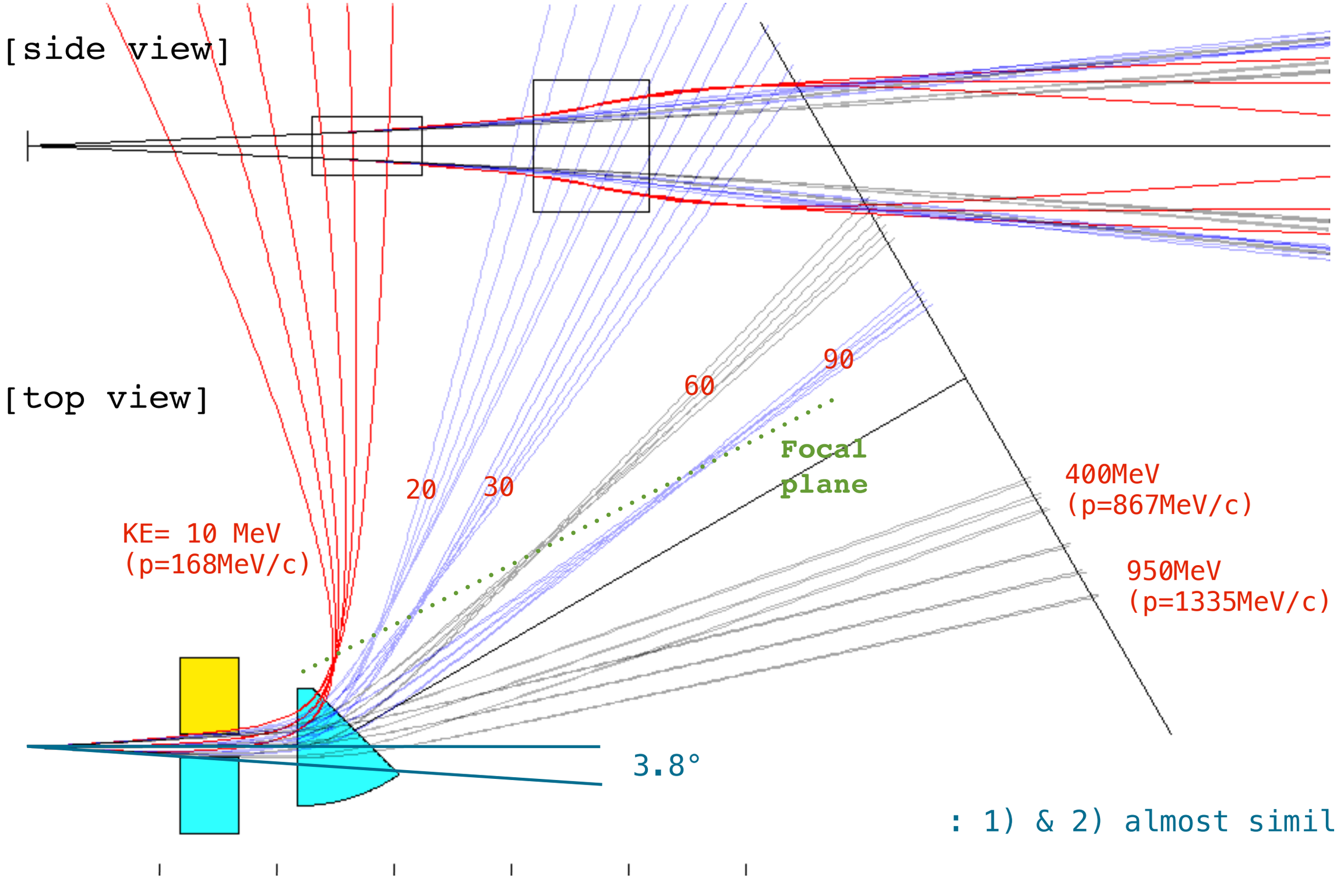



* Problem :
disturb the zero-degree neutron detector! (~3.8°)

1) R=1.0m,  B_DP = 1.3T,  β=10°,  θ=35°  B_Q = 0.5T/m (x-focusing)



2) R=1.0m,  B_DP = 1.5T,  β=15°,  θ=30°  B_Q = 0.5T/m (x-focusing)




: 1) & 2) almost similar

# [ Future plans ]

- need to adjust the energy range.

- QQD system simulation

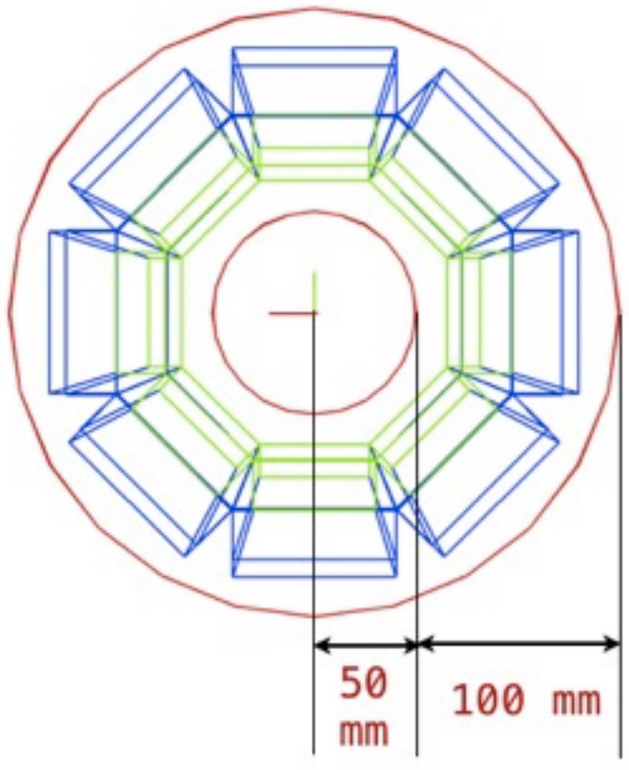
- check beam aperture & angular acceptance.

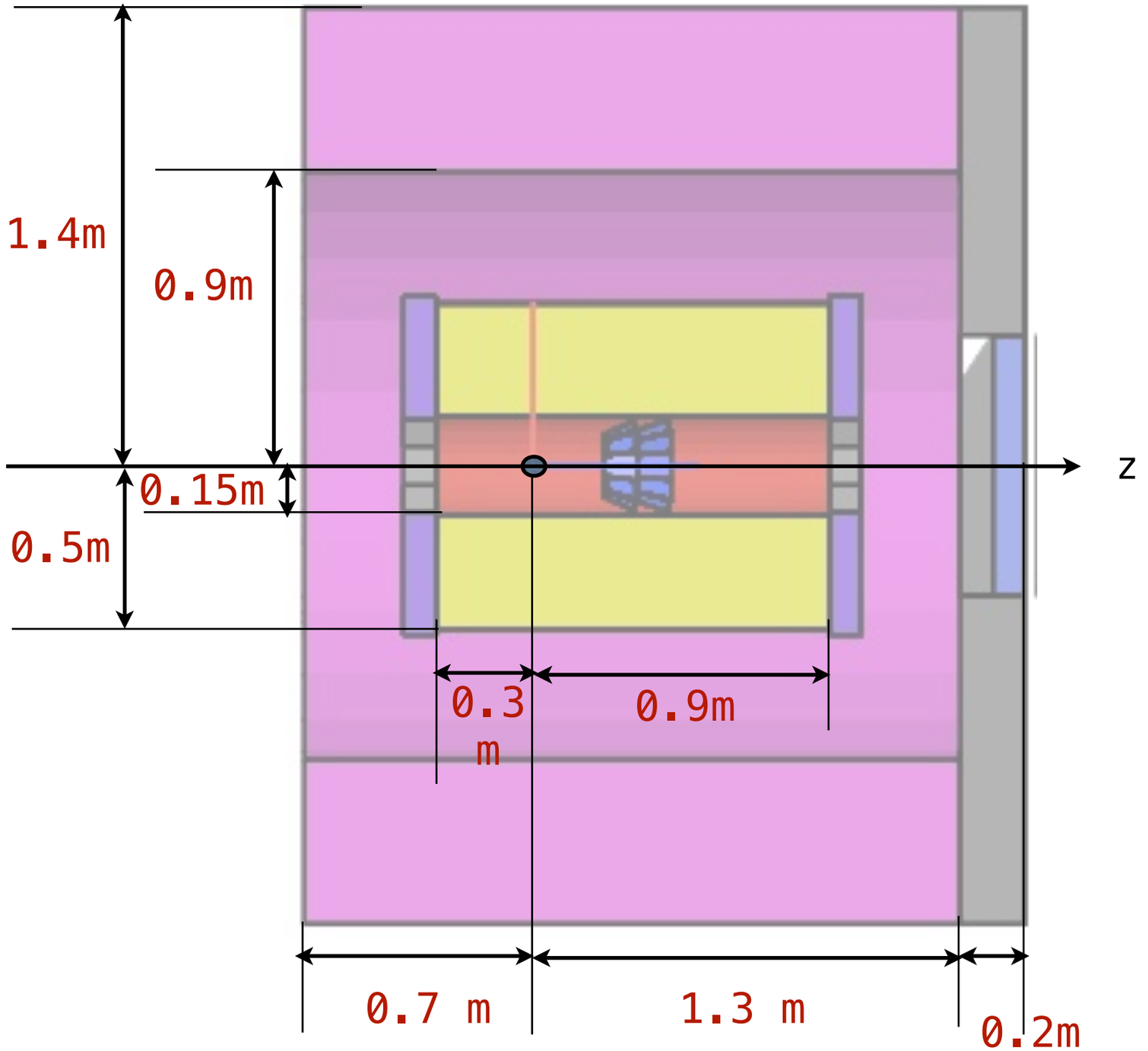
- more precise simulation using other programs.
  (TRANSPORT, GICOSY, GEANT4 etc.)

# Back up slides

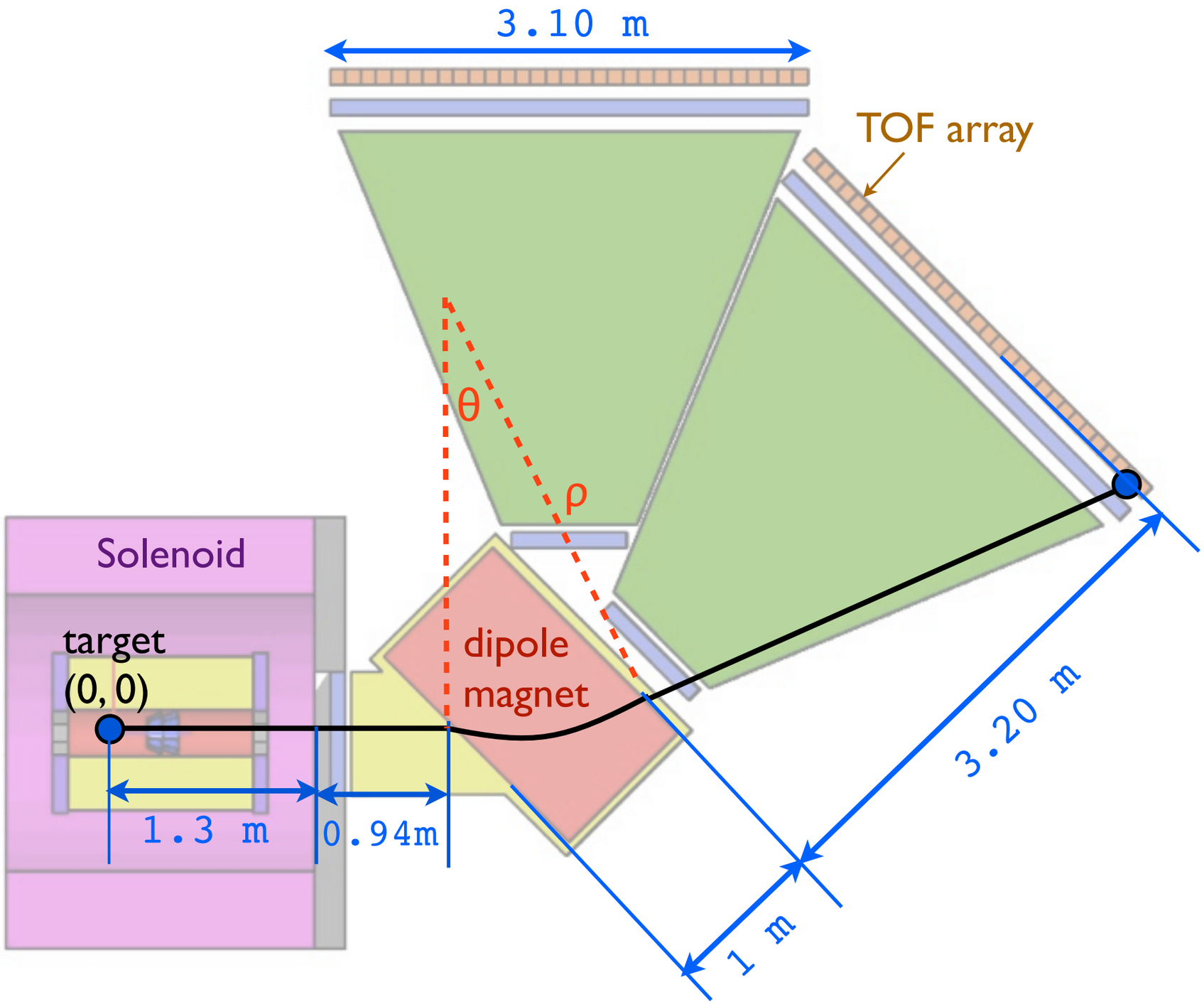
# scale

* TPC inner R = 0.15 m
* TPC outer R = 0.5 m
* Solenoid inner R = 0.9m
* Solenoid outer R = 1.4 m
* Si-CsI inner R = 0.05 m
* Si-CsI outer R = 0.15 m



# scale


3.10 m
TOF array
θ
ρ
Solenoid
target
(0, 0)
dipole
magnet
1.3 m
0.94m
3.20 m
1 m