20121102

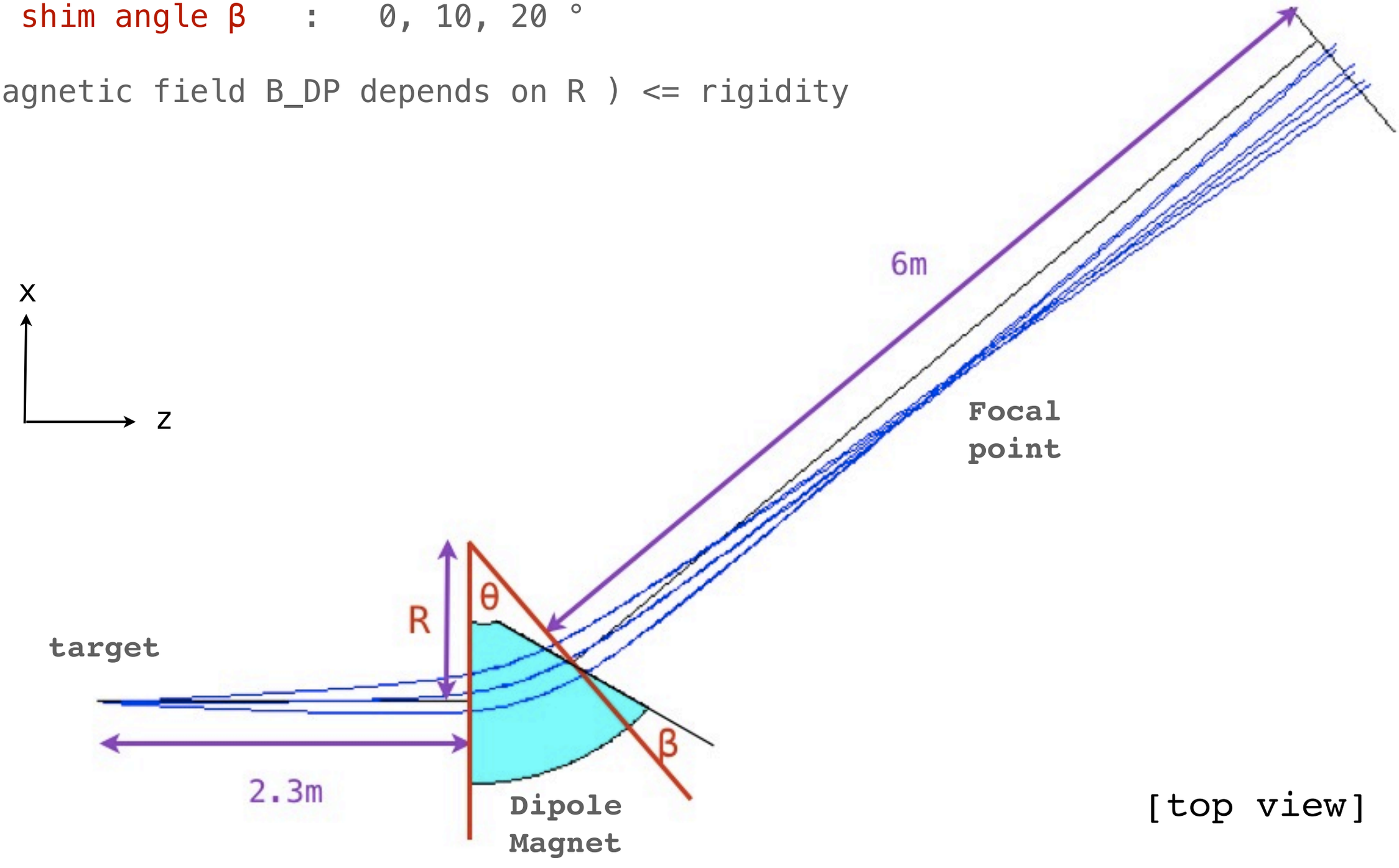
KYO

: DP only
:QD system

[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

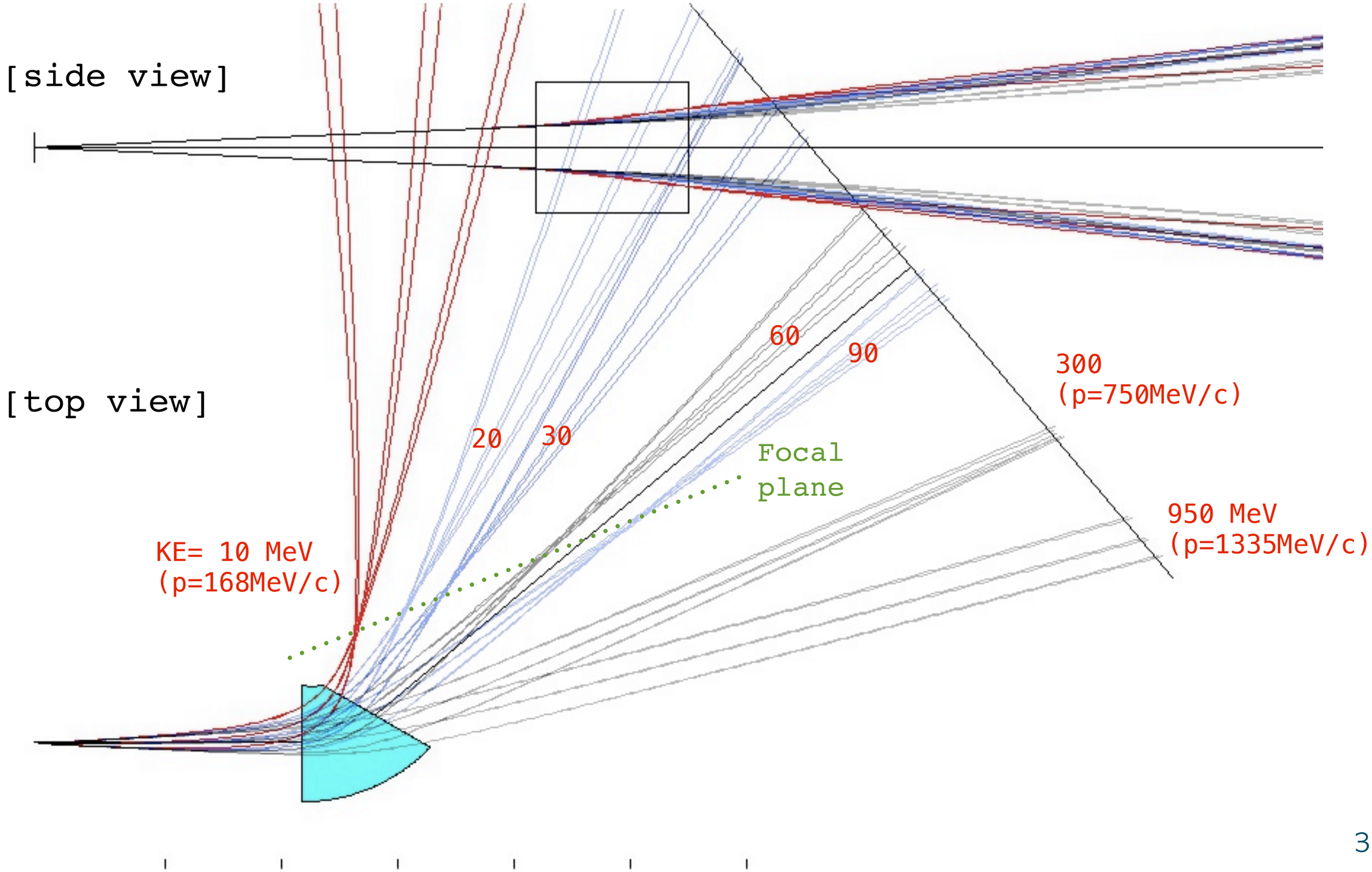


[top view]

[DP only]

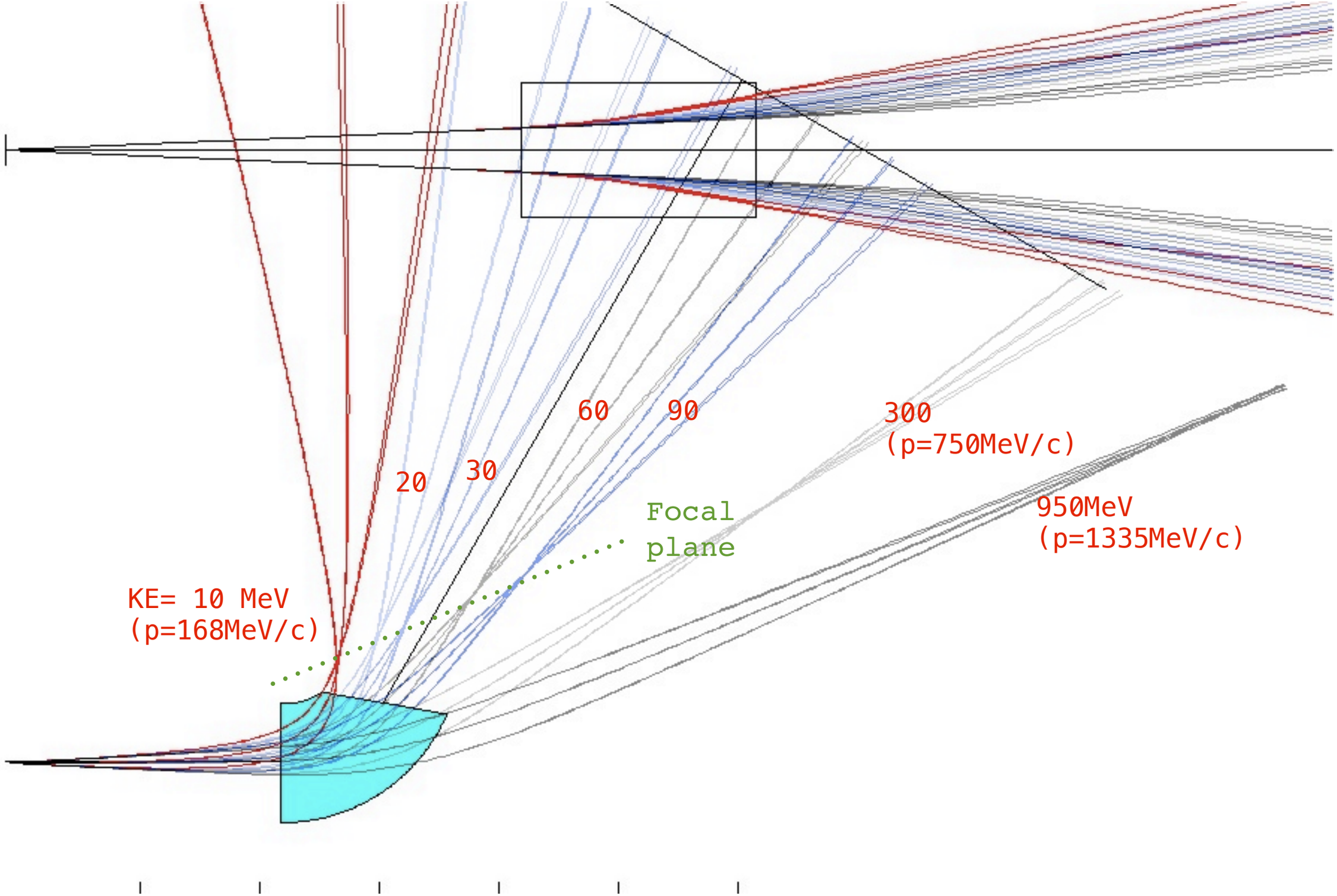
1) R=1.0m, B_DP = 1.2T, β=20°, θ=40°

- energy range : 10 – 950MeV
- focal plane : farther



2) R=1.0m, B_DP = 1.0T, β=20°, θ=60°

- energy range : 10 – 300MeV
- focal plane : closer & clearer



[Predict the energy range of protons]

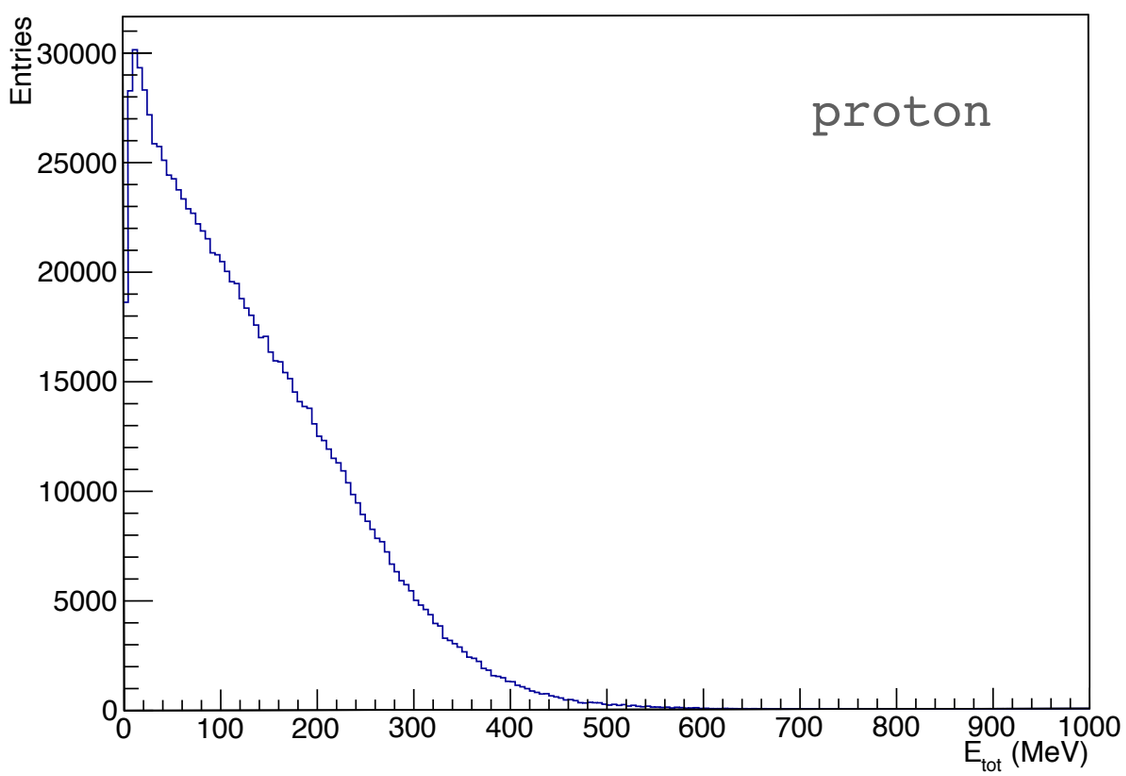
* Fermi momentum of proton : $p_{\mathrm{F}} = p_{\mathrm{F,n}} = p_{\mathrm{F,p}} = \frac{\hbar}{R_0}\left(\frac{9\pi}{8}\right)^{1/3} \approx 250\ \mathrm{MeV}/c$

* Fermi energy of proton : $E_{\mathrm{F}} = \frac{p_{\mathrm{F}}^2}{2m_{\mathrm{N}}} \approx 33\ \mathrm{MeV}$

* up to 3σ : ~ 100 MeV

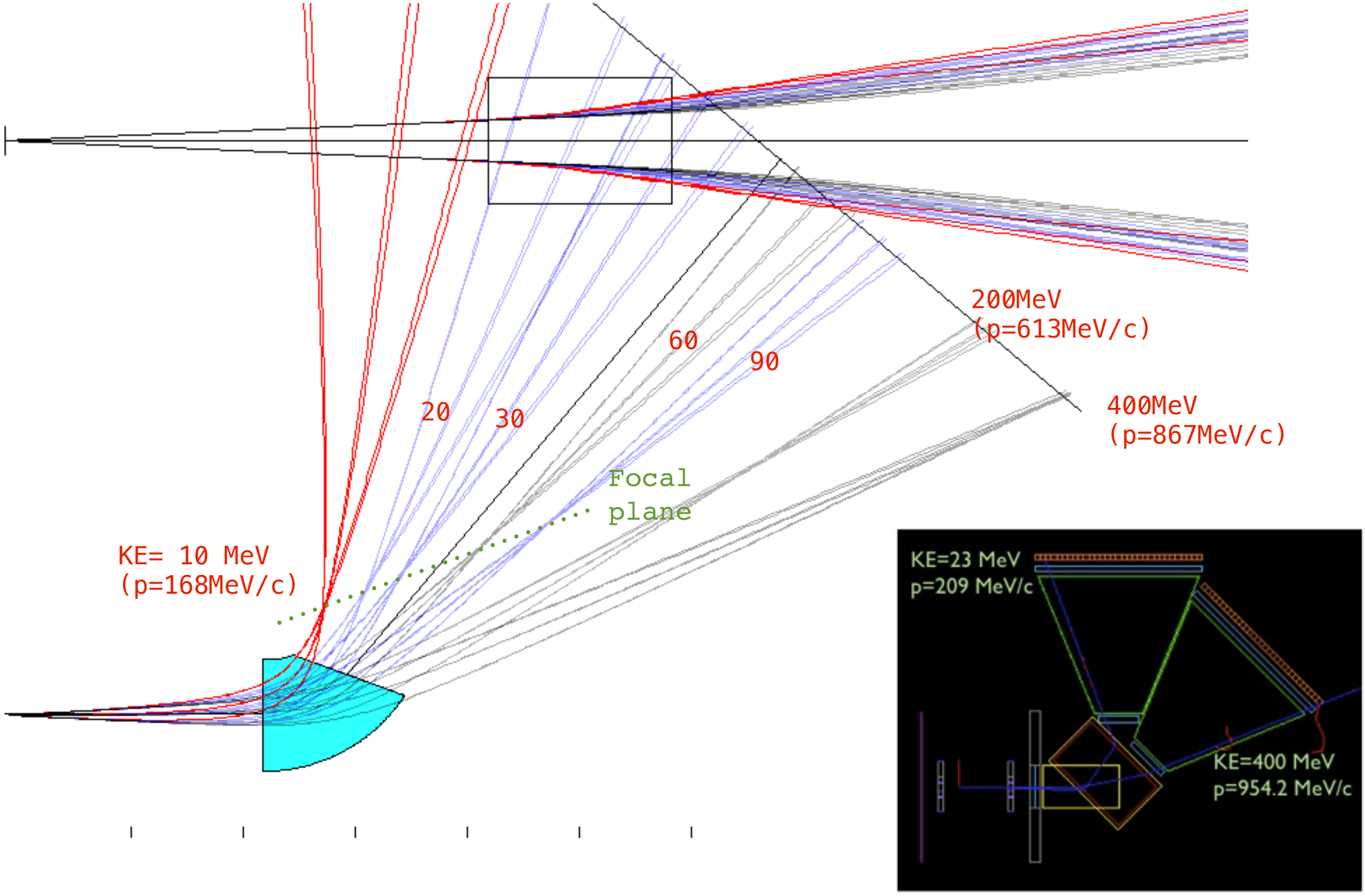
Therefore,
Beam energy 300MeV + Fermi energy 100MeV = ~ 400MeV ?
(momentum range : ~ 867MeV/c)

cf)
IQMD data simulation
: Au-Au collision
: 250 AMeV
: 10000 events



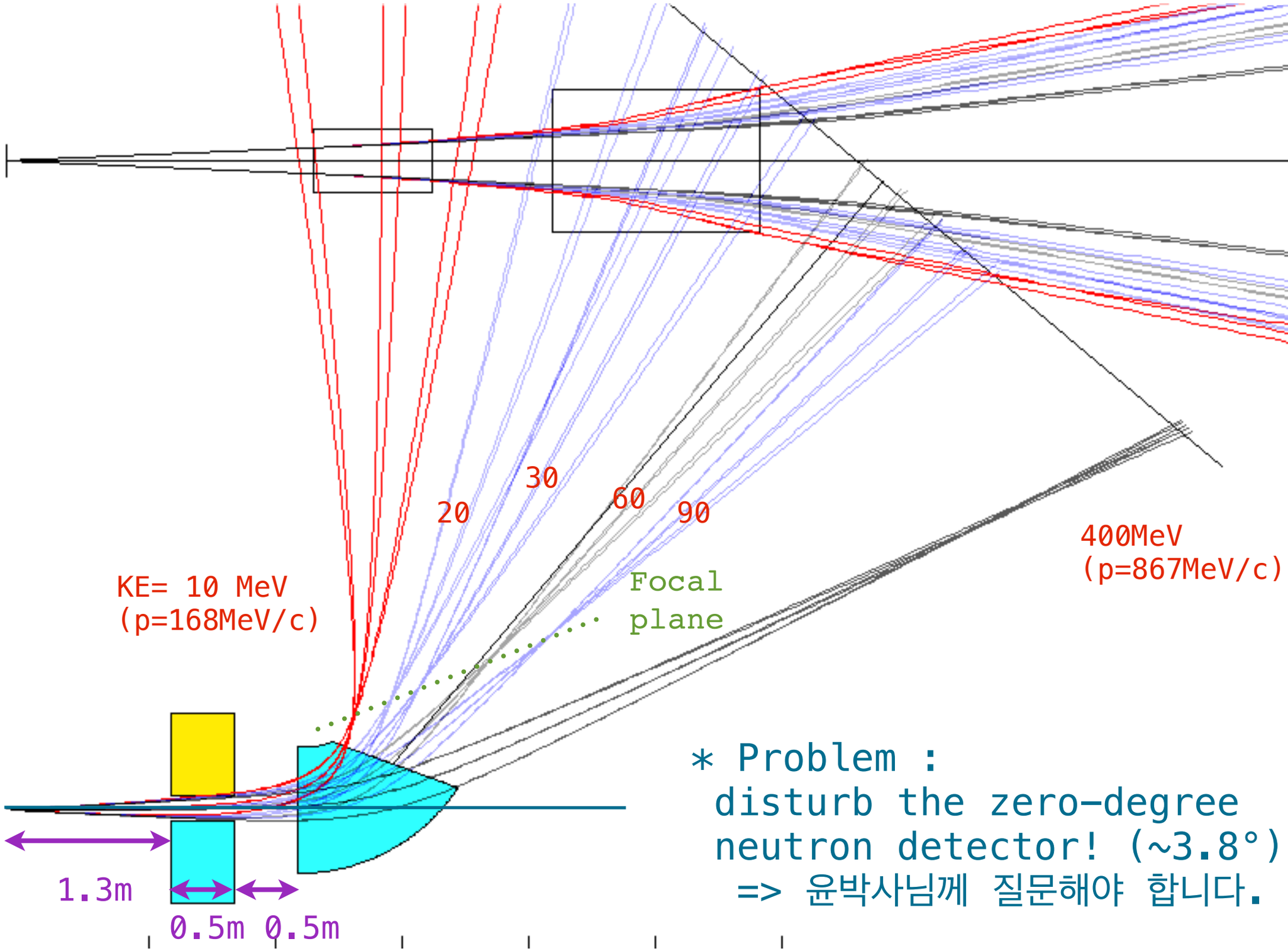
3) R=1.0m, B_DP = 1.0T, β=20°, θ=50°

- energy range : 10 – 400MeV



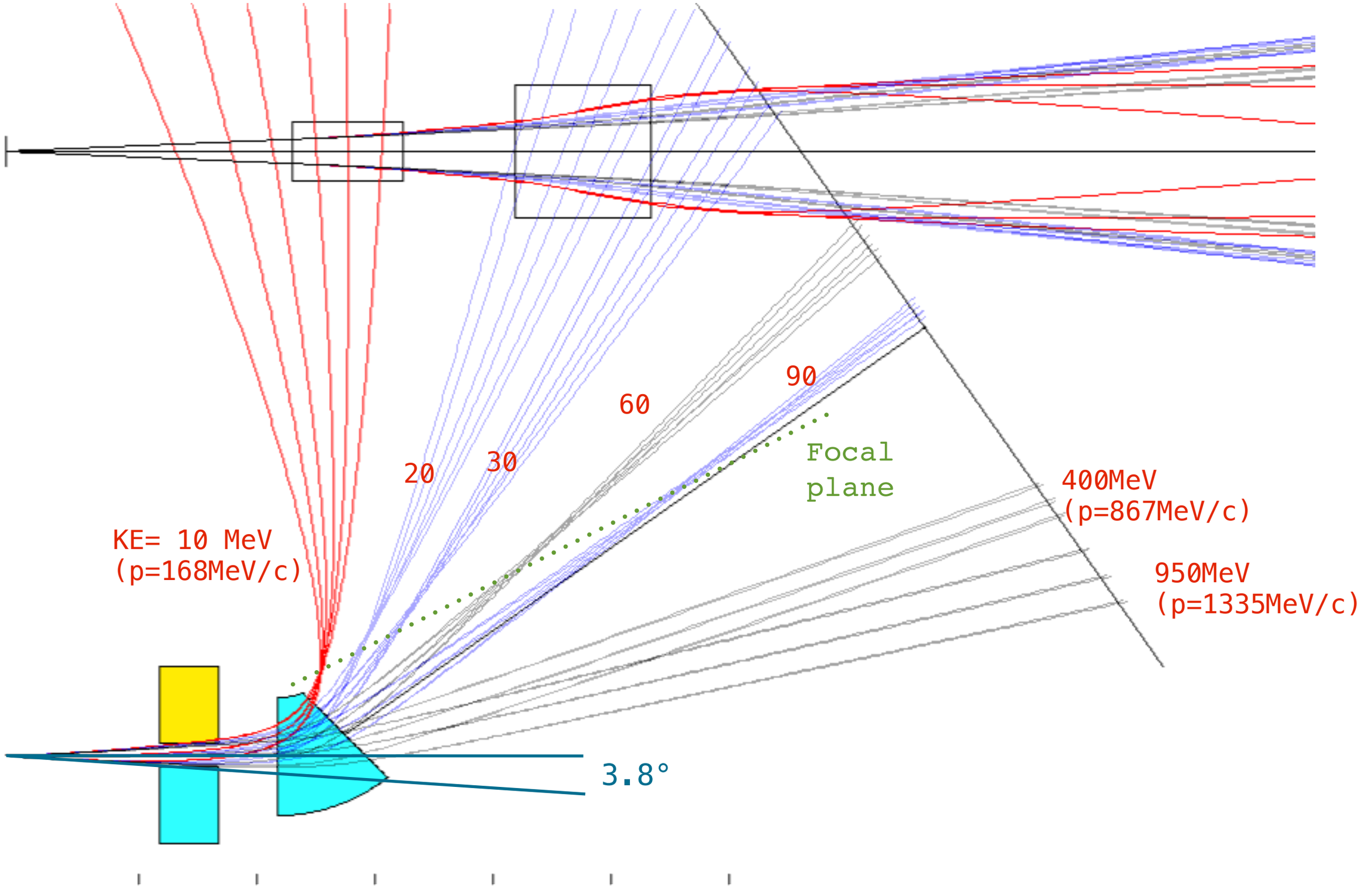
[QD-system]

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

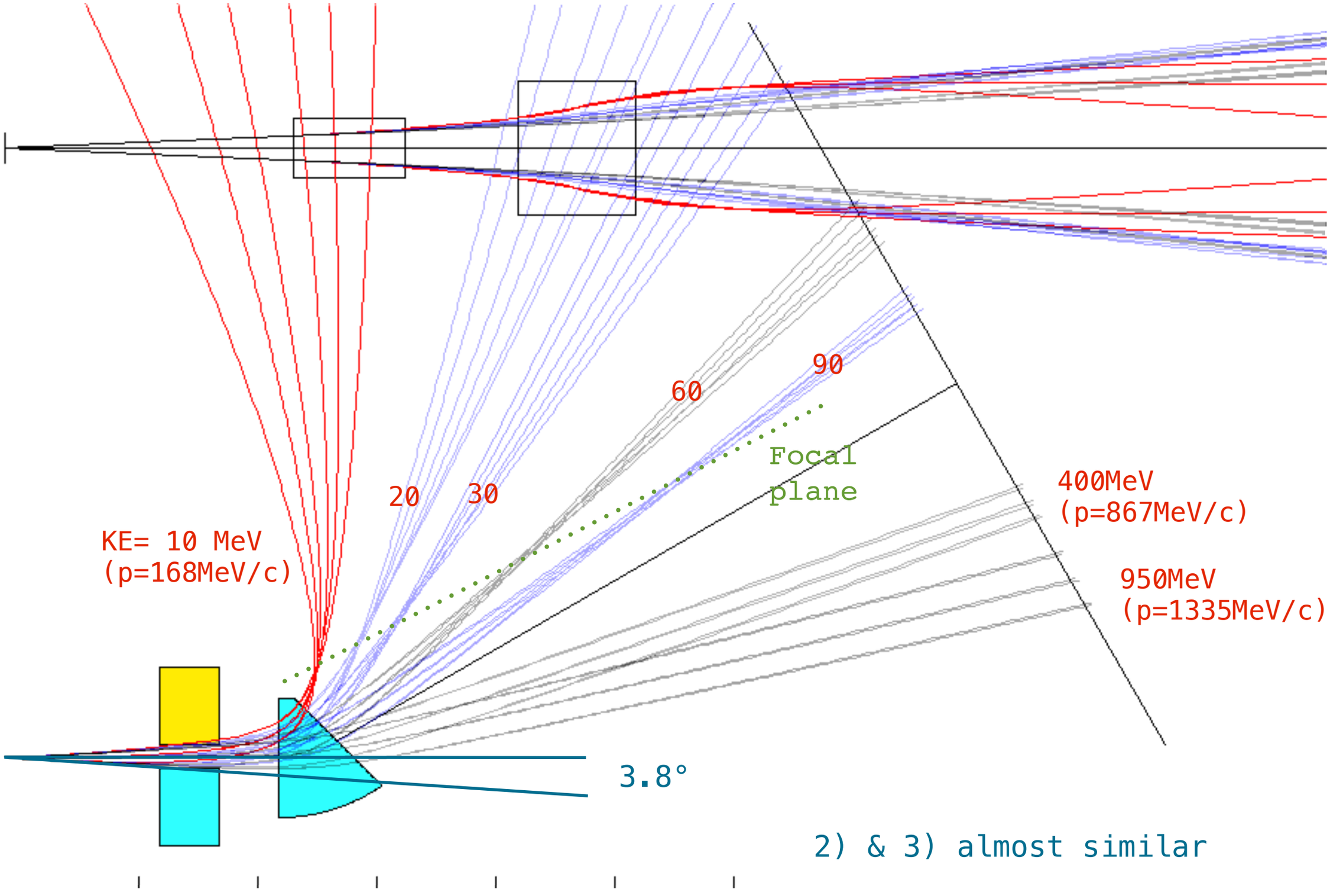


* Problem :
disturb the zero-degree
neutron detector! (~3.8°)
=> 윤박사님께 질문해야 합니다.

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



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



2) & 3) almost similar

[Future plans]

- QQD system simulation

- check beam aperture & acceptance.

- more precise simulation using other programs.