The SBS spectrometer and a double SBS

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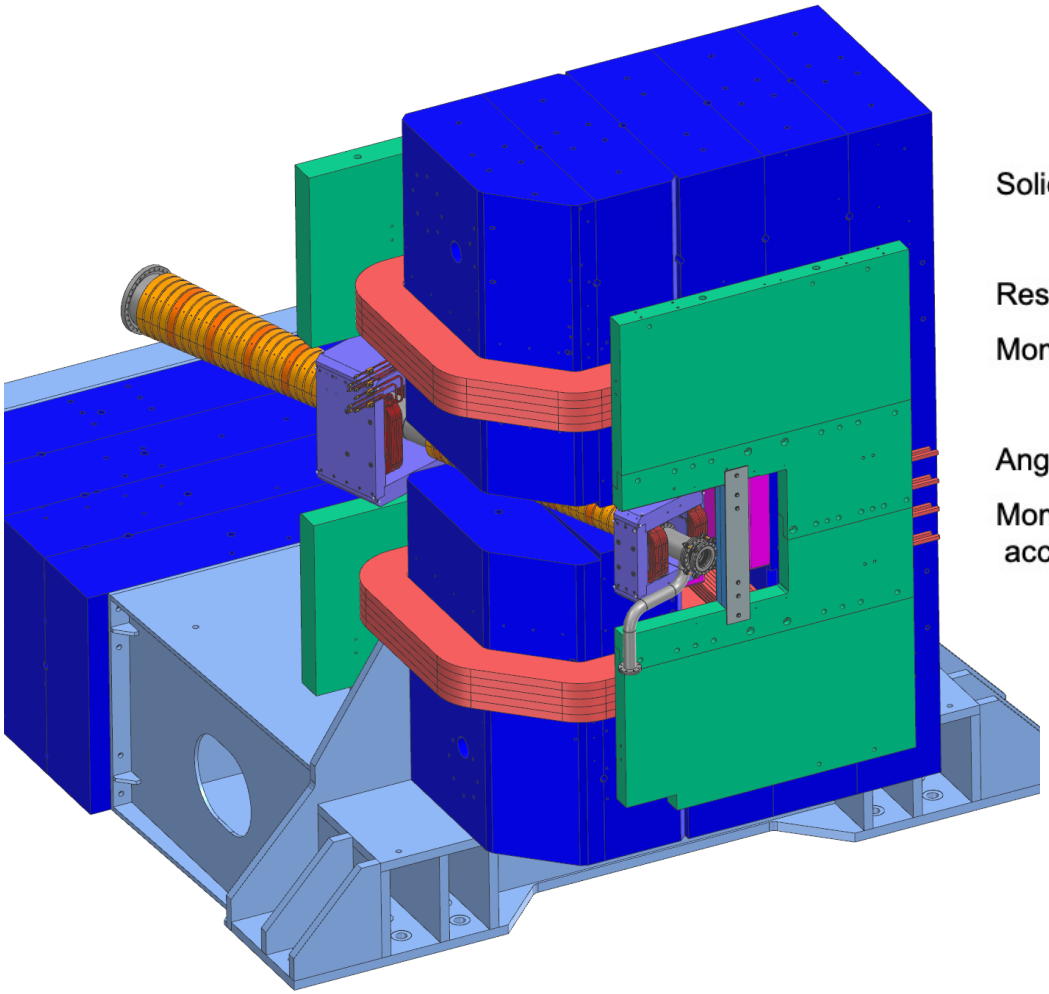
for collaboration

The SBS spectrometer



Solid angle

Resolution:

Momentum => $\frac{\sigma_p}{P} = \mathbf{0.0029} + \mathbf{0.0003} \times p[\mathrm{GeV}]$

Angular => $\sigma_\theta = \mathbf{0.14} + \mathbf{1.3}/p$ [GeV], mrad

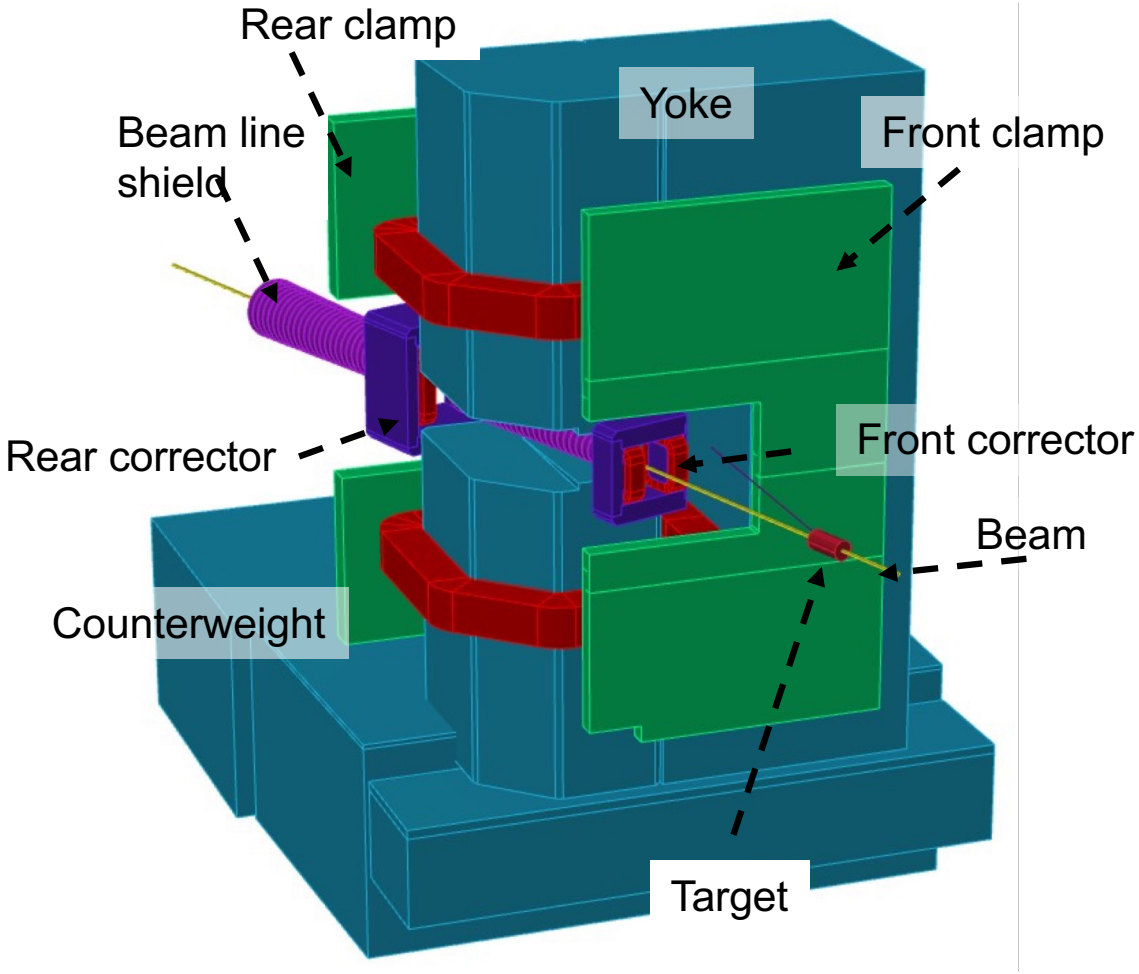
Momentum acceptance => P range from $\mathbf{2} - \mathbf{10}$, GeV/c

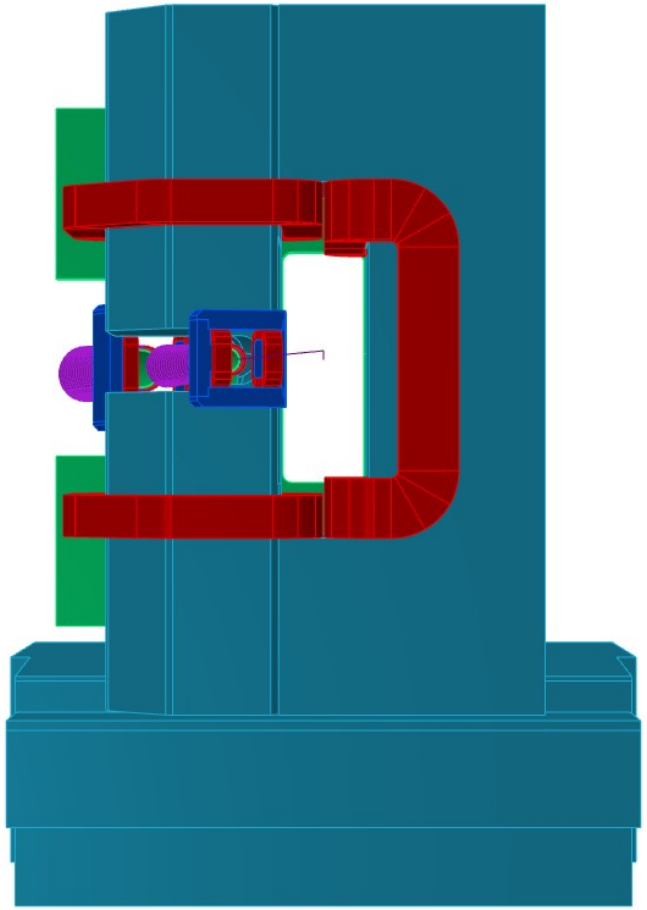
$\theta_{central}$, degree	Ω, msr	D, meter	Hor. range, degree	Vert. range, degree
3.5	5	9.5	± 1.3	±3.3
5.0	12	5.8	± 1.9	±4.9
7.5	30	3.2	± 3	±8
15	72	1.6	± 4.8	±12.2
30	76	1.5	± 4.9	±12.5

Max solid angle 70 msr
Field Bdl ~ 2 T-m

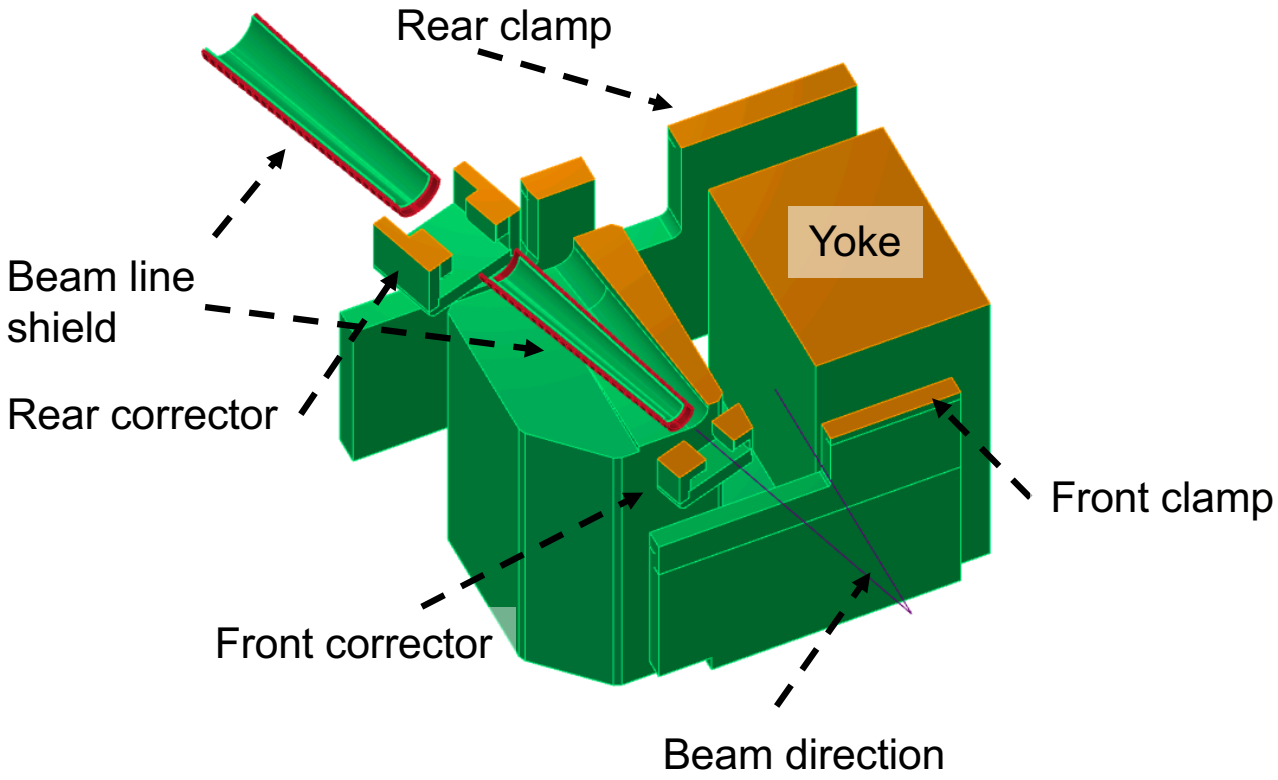
GEp 35 msr, 2.5 T-m

The SBS spectrometer in OPERA

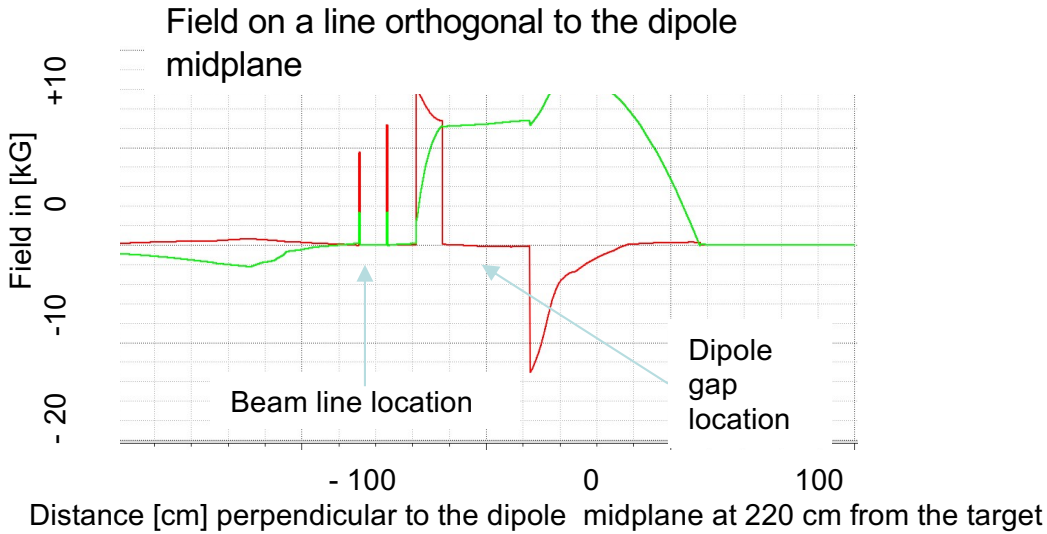


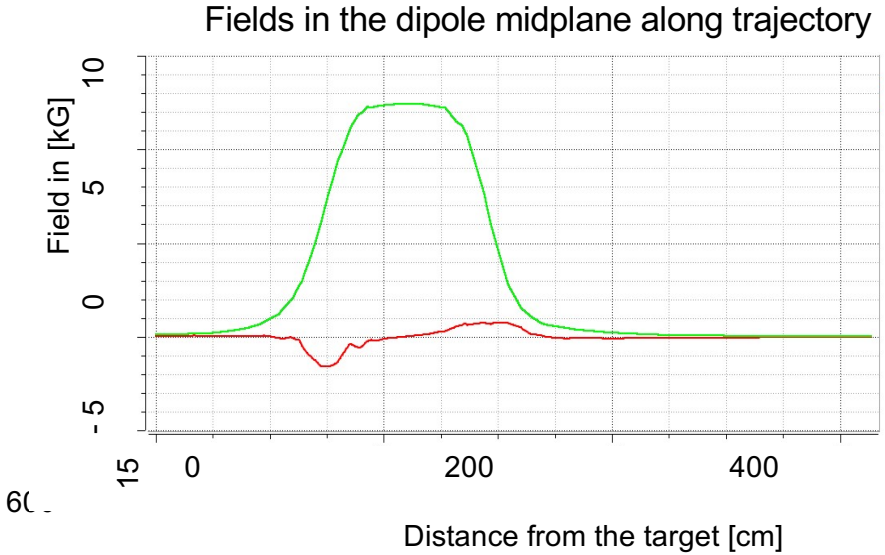


The SBS spectrometer cutaway view



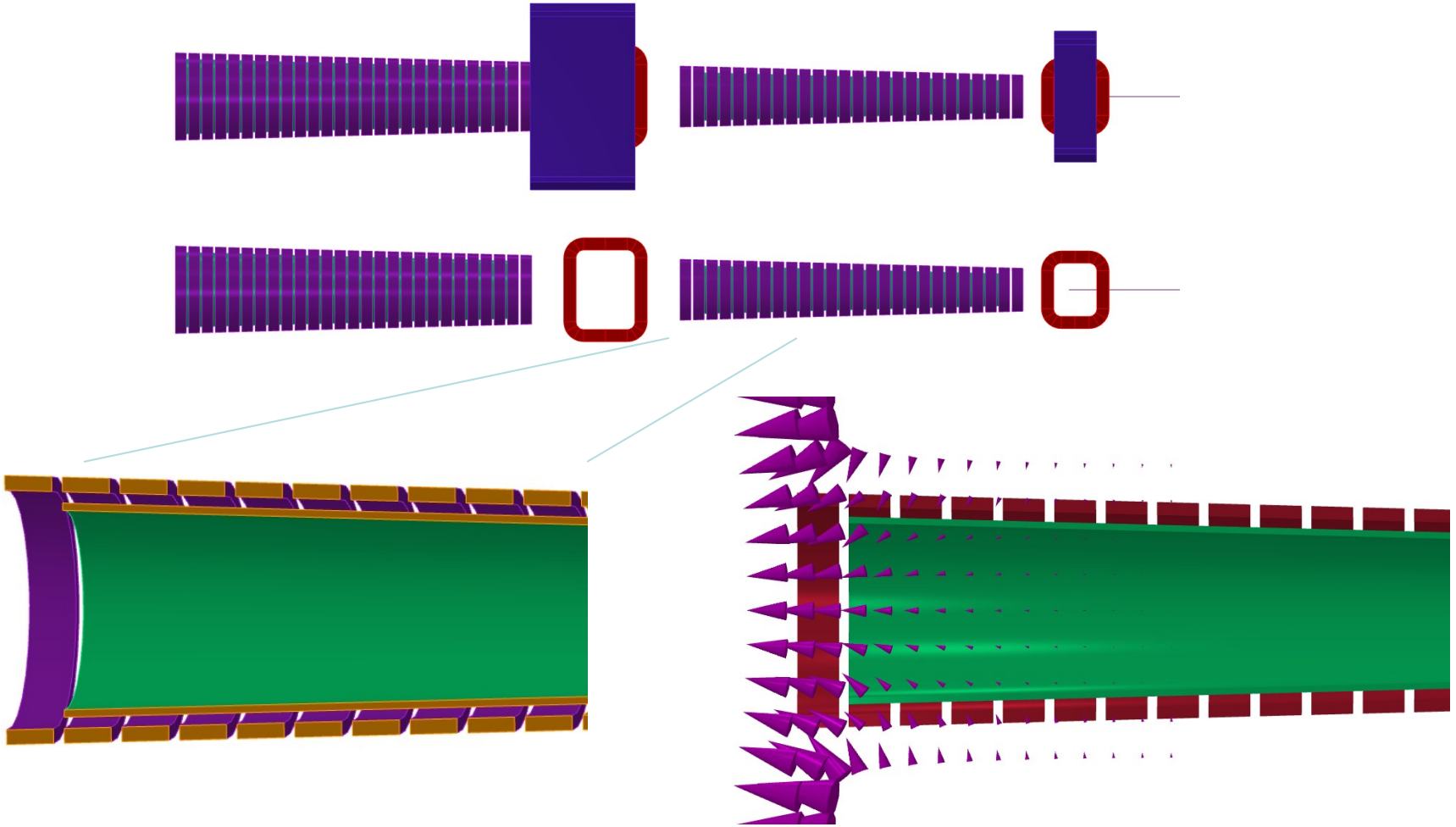
The SBS spectrometer magnetic fields



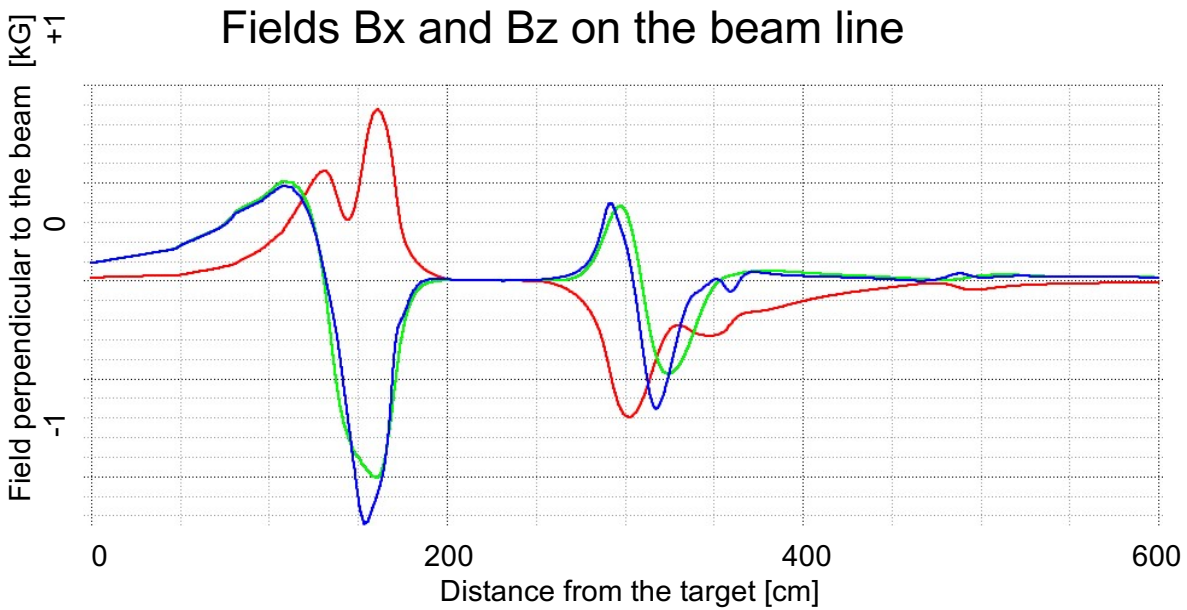


The SBS spectrometer beam line

Beam line shielding structure

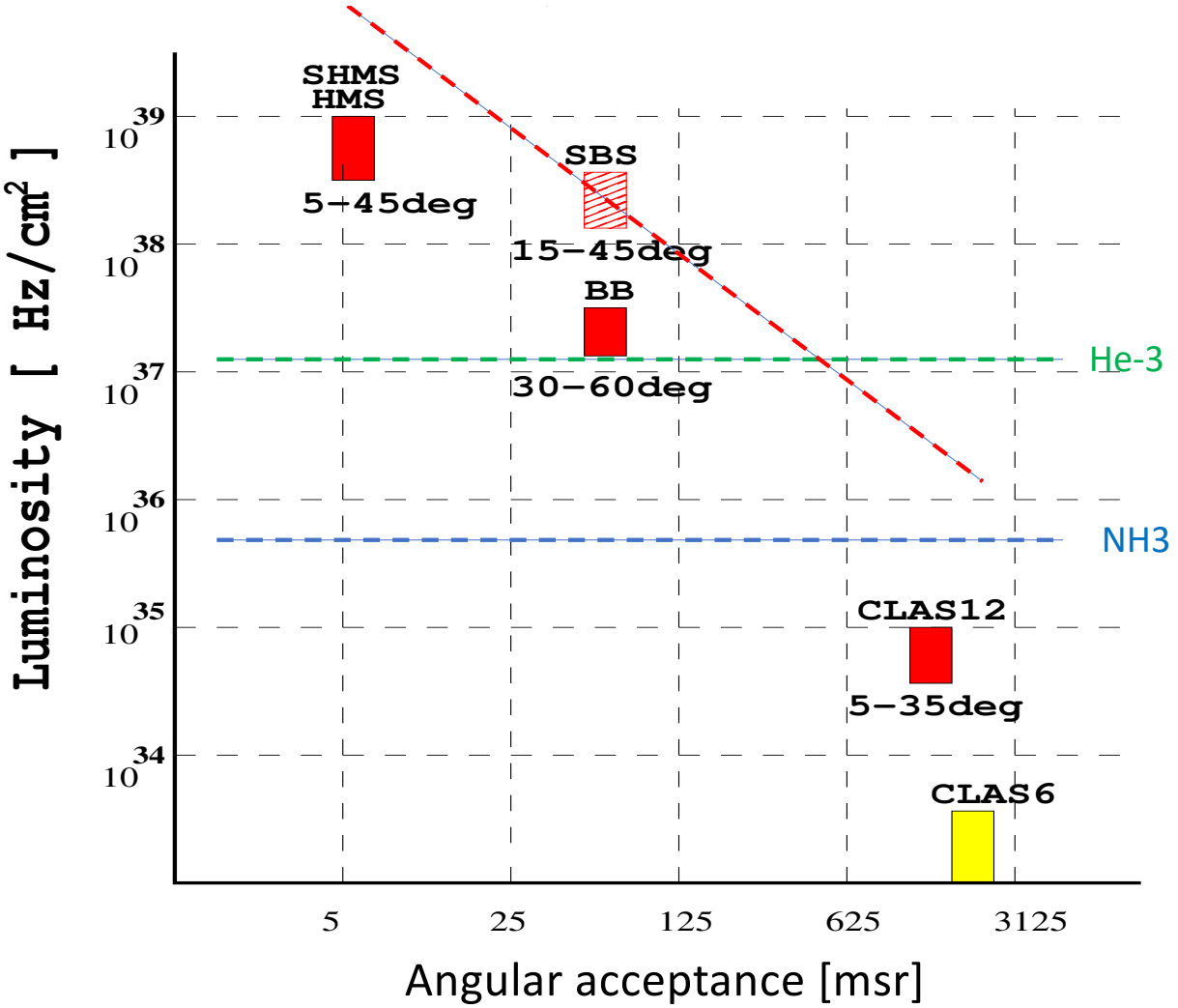


The SBS spectrometer beam line fields



Integral Bdl < 3 kG-cm

The SBS spectrometer FOM

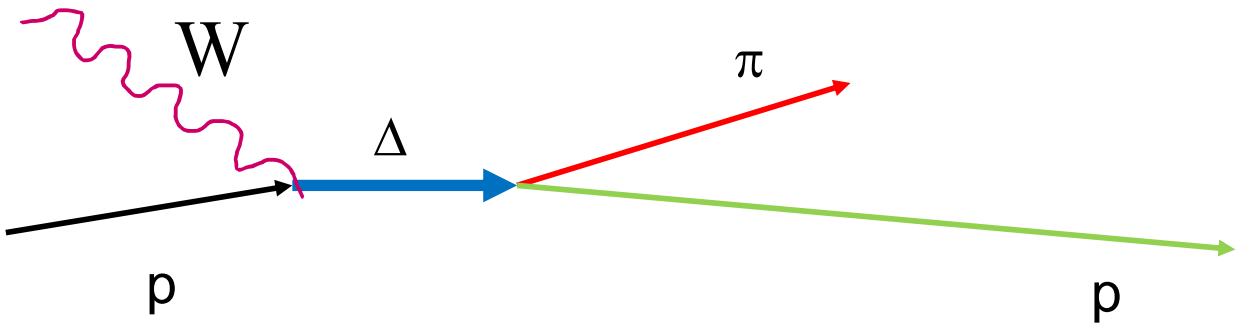


What about a spectrometer for (e, e' ϕ) and (e, e' Δ)?

Motivation:

H(e,e'K^+K^-) is a potential way to study the mass distribution

H(e,p π^-)ν is a cost effective experiment for the Axial Form Factor



The BNL wide 48D48

Dimensions of the iron:
146.5” tall
110” wide
48” deep
31” gap (3” pole ext.)

The BNL wide 48D48

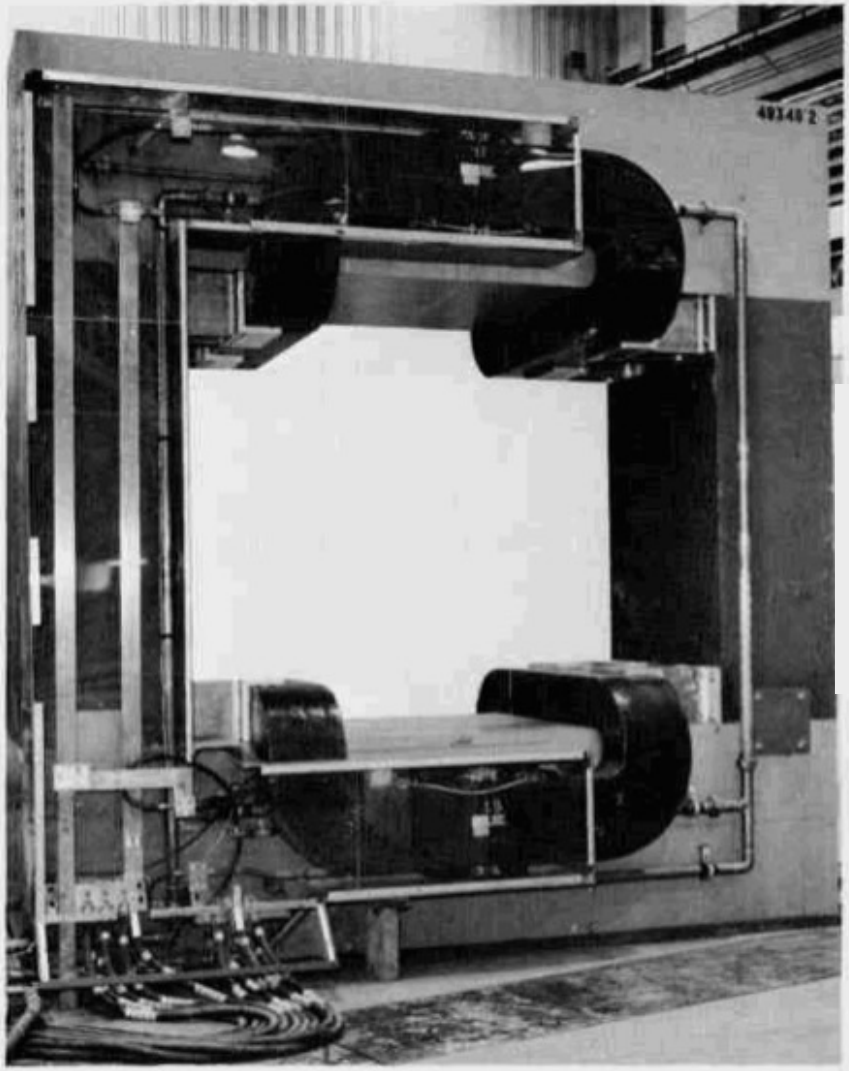
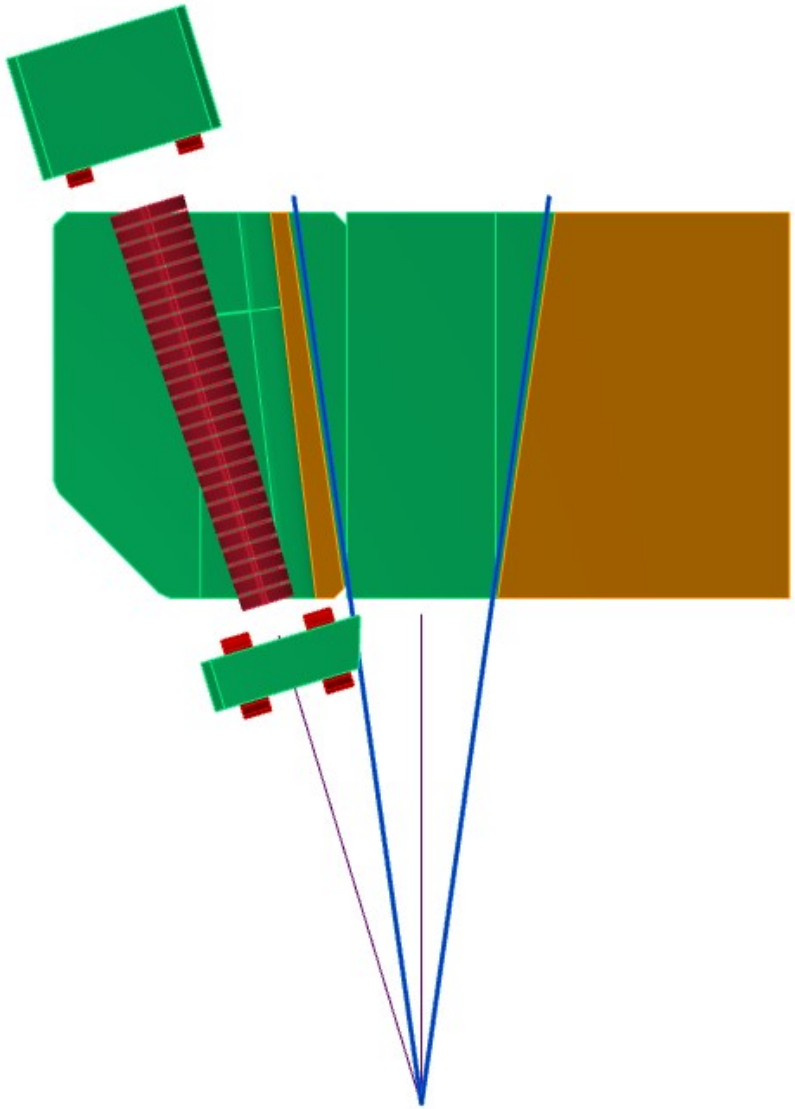


Figure 12. One of the large spectrometer magnets for use in an experiment at the AGS to measure the momenta of particles emitted in the decay of K mesons. The magnet has been modified to include a gap of 78 in. between the magnet poles. The larger volume of magnetic field will allow many decays to be studied simultaneously.

Open SBS for a P33 resonance detection

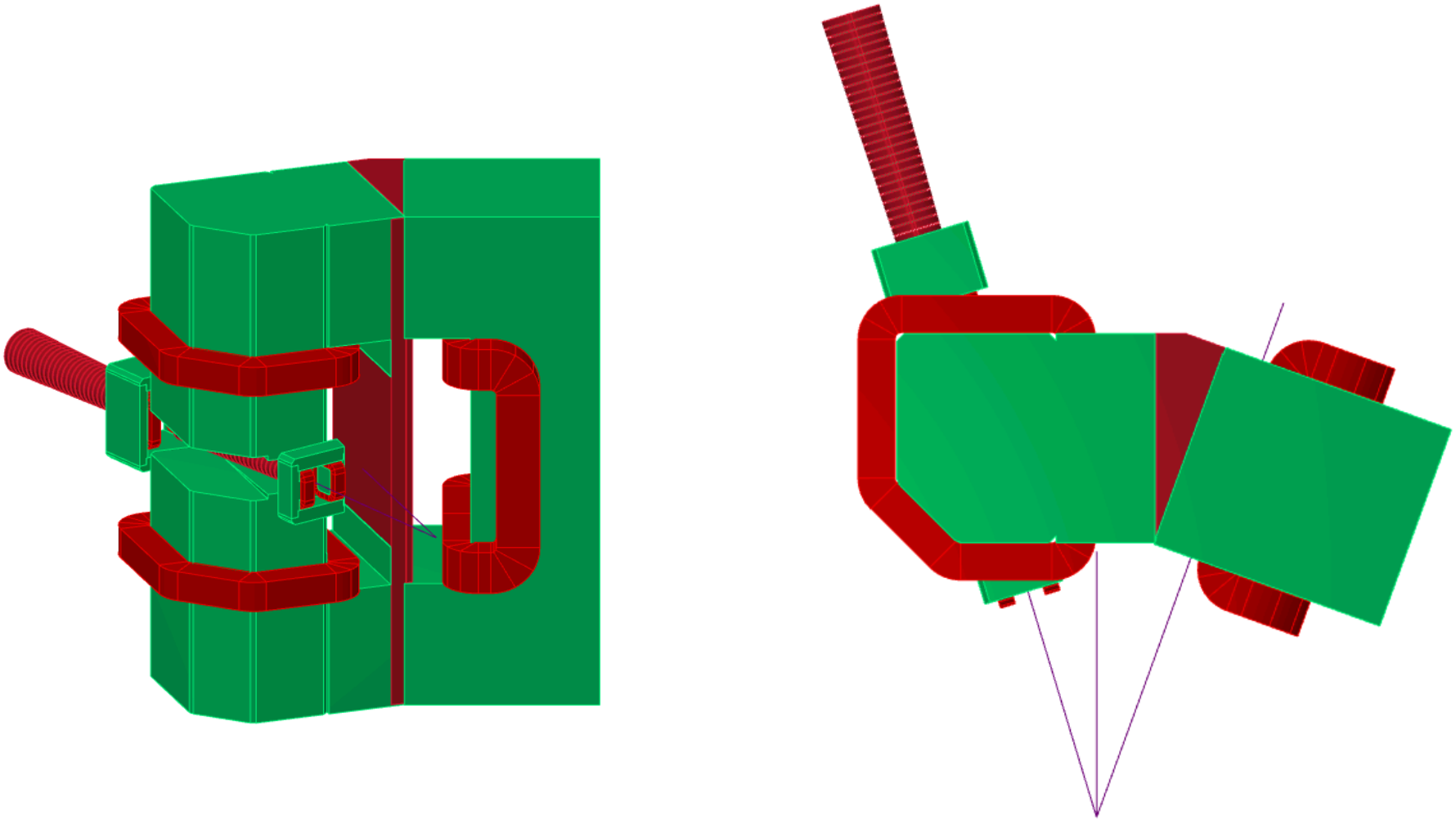


Solid angle 130 msr

Field Bdl = 1.6 T-m

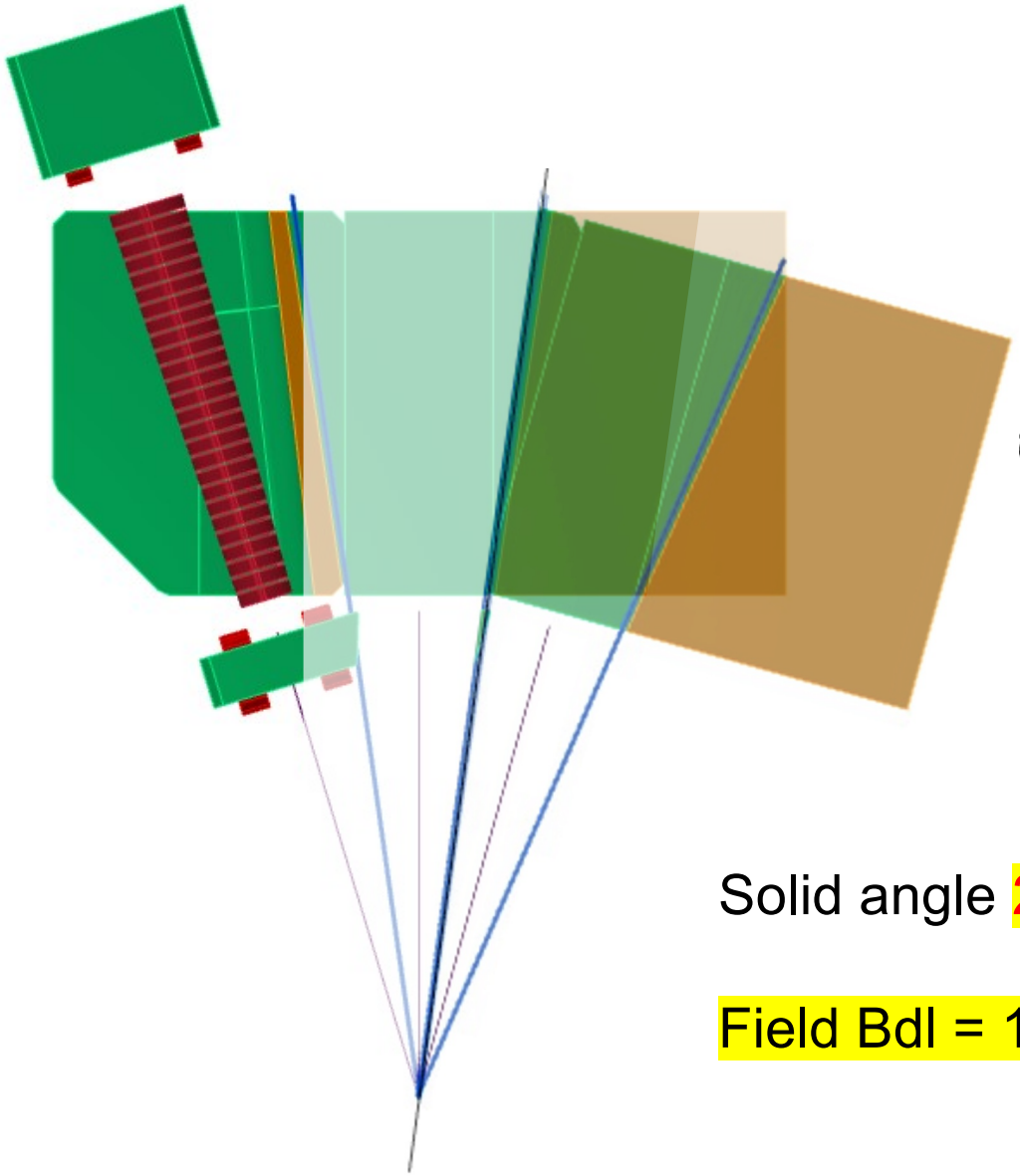
Cost of cutting ~ $50k

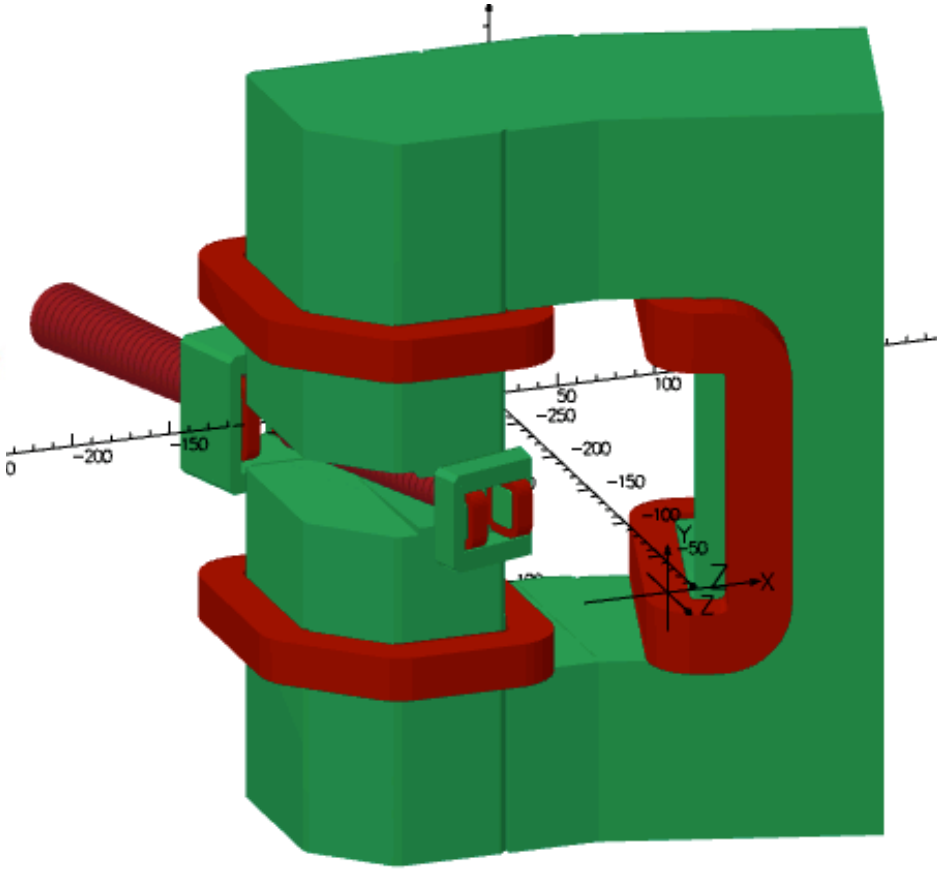
Double SBS for a P33 resonance detection



Combined solid angle 140 msr; Bdl ~ 1.3-1.4 T-m in each gap

Double Open SBS – DO SBS

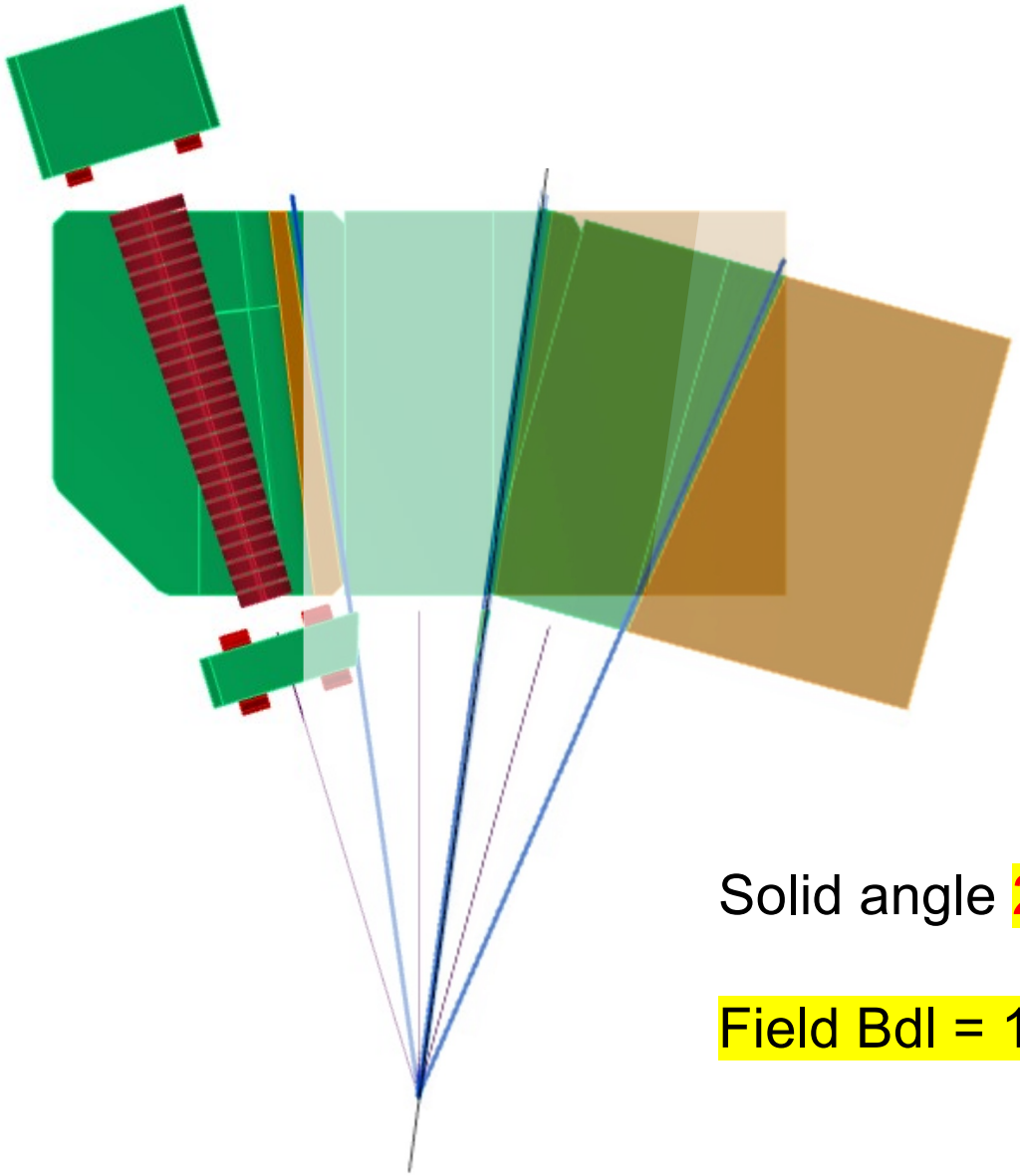


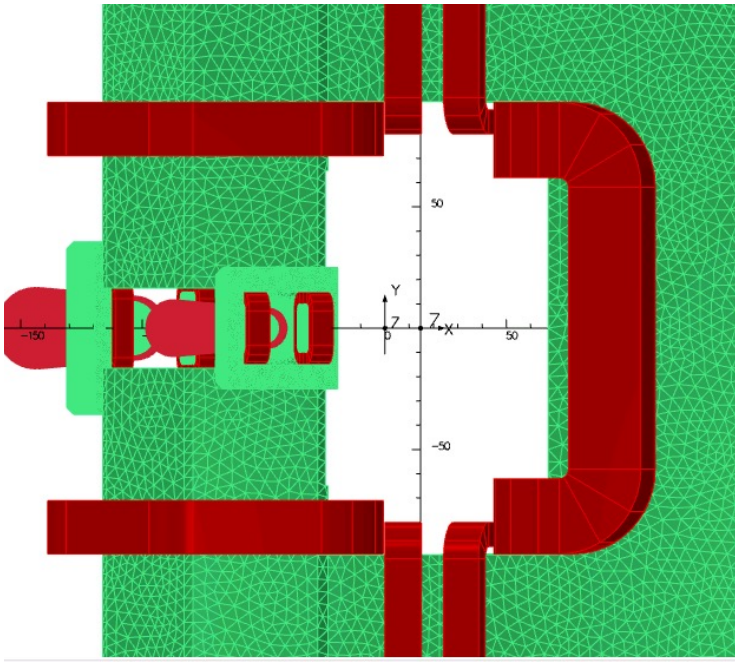


Solid angle 260 msr

Field Bdl = 1.1 T-m

Double Open SBS – DO SBS

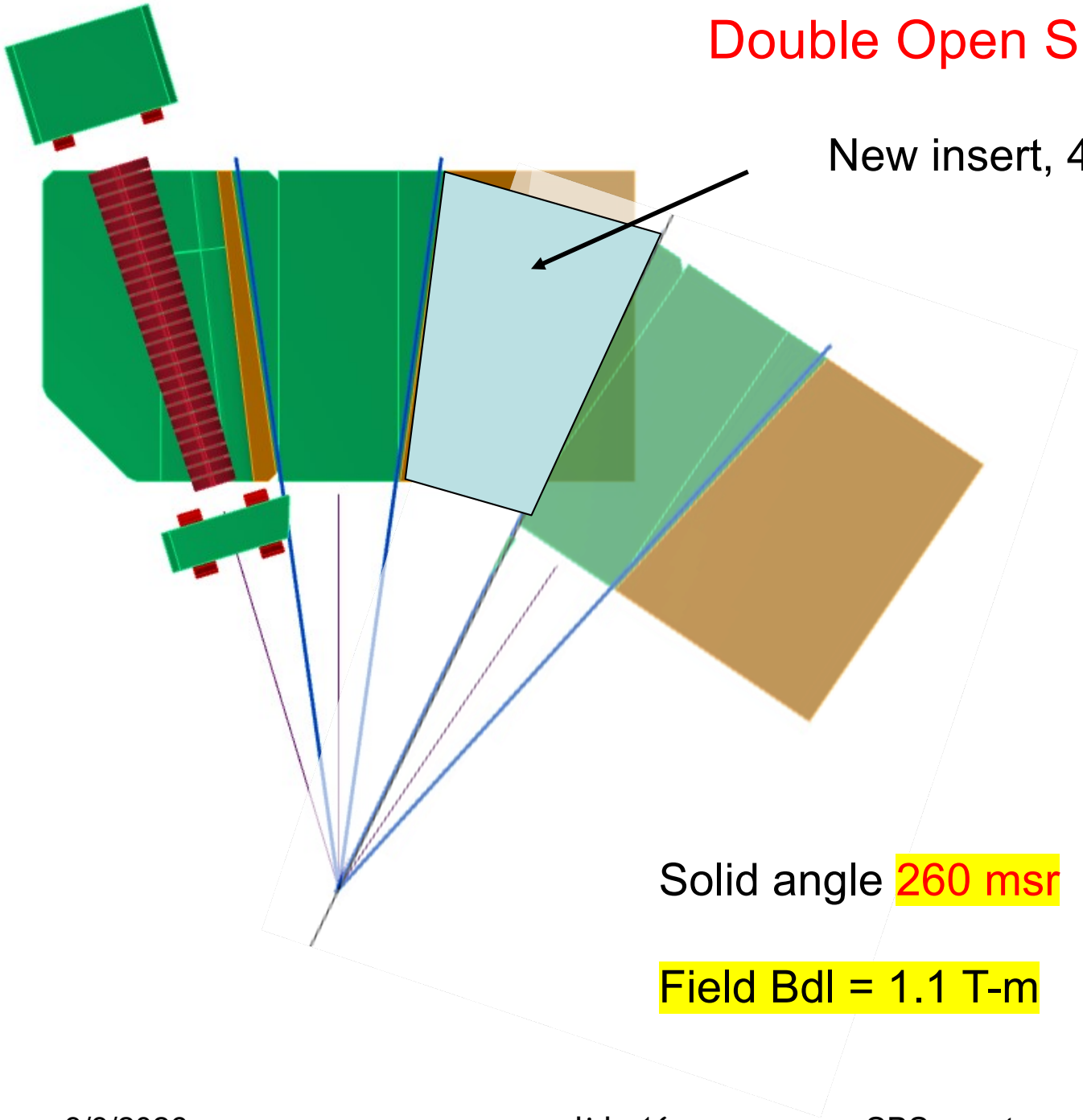




Solid angle 260 msr

Field Bdl = 1.1 T-m => 1.5 T-m with extra flat coils

Double Open SBS – DO SBS



Solid angle 260 msr

Field Bdl = 1.1 T-m