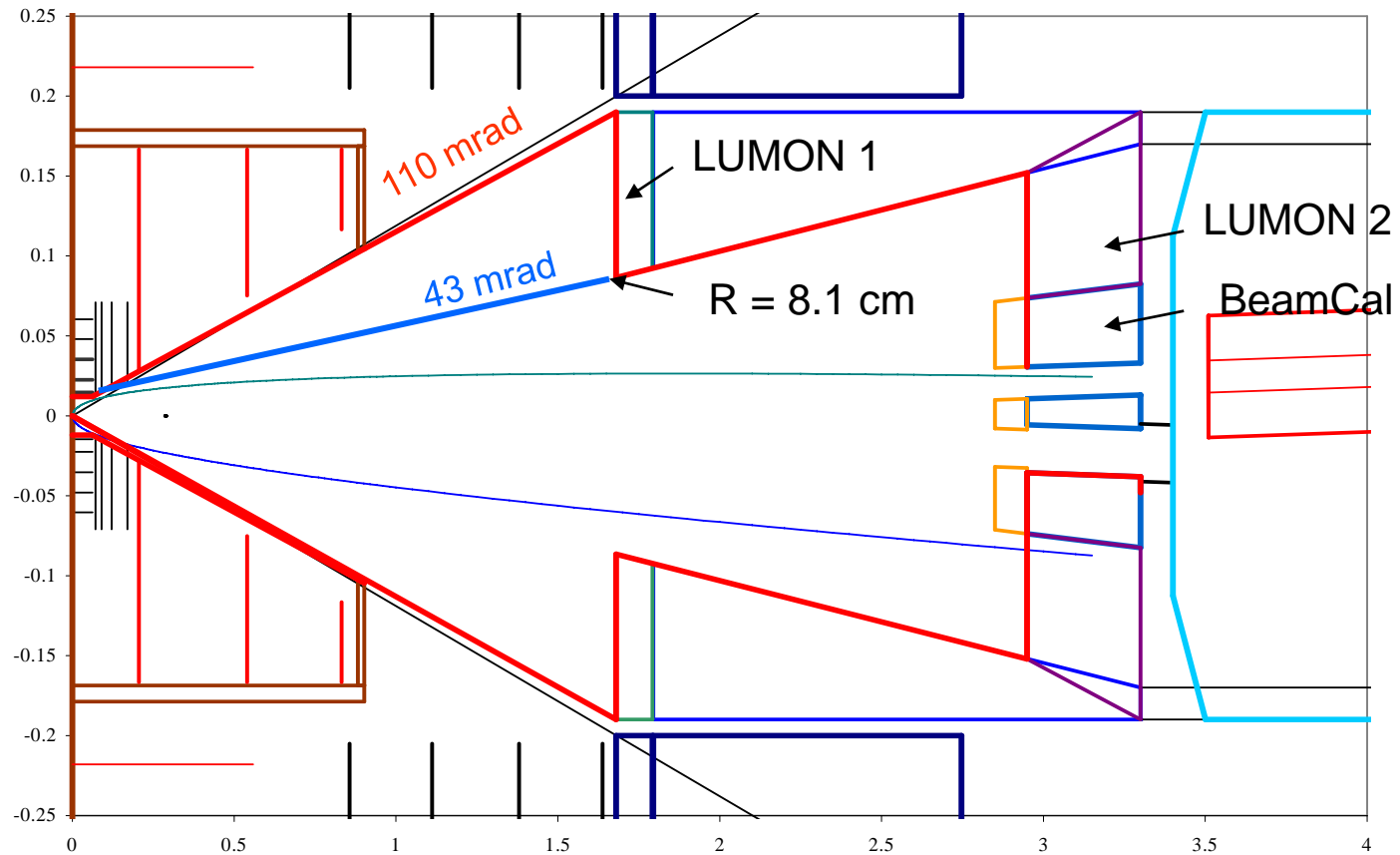


LUMON and Beam pipe

Takashi Maruyama

LUMON and Beam pipe

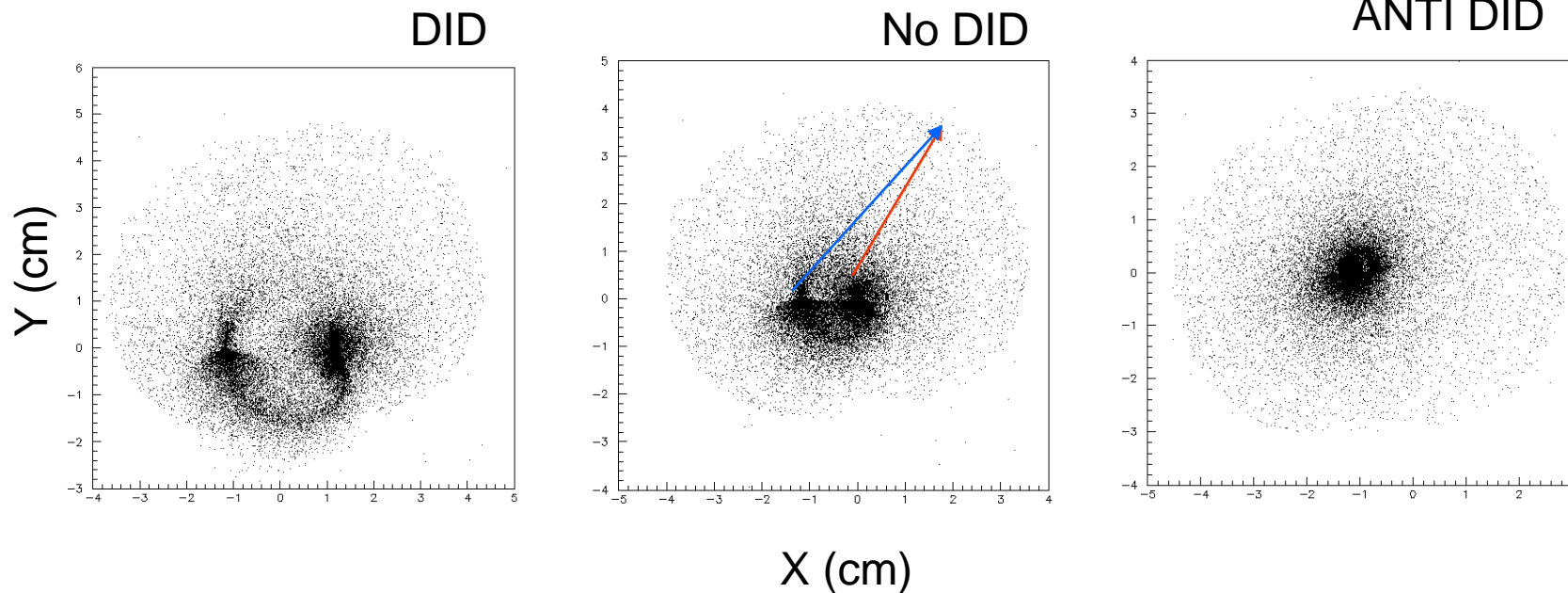


- Can the inner radius of LUMON-1 be smaller?
- Should LUMON be centered on the solenoid axis or the extraction line?
- The beam pipe:
 - Current 43 mrad beam-pipe to 110 mrad.
 - Is it compatible with pairs?

Pair distribution at $Z = 168$ cm

- Beam parameters – Nominal, Low Q, High Y, Low P, High Lumi
- Solenoid field strength – 5 Tesla vs. 4 Tesla
- Crossing angle (14 mrad) + DID/ANTI-DID

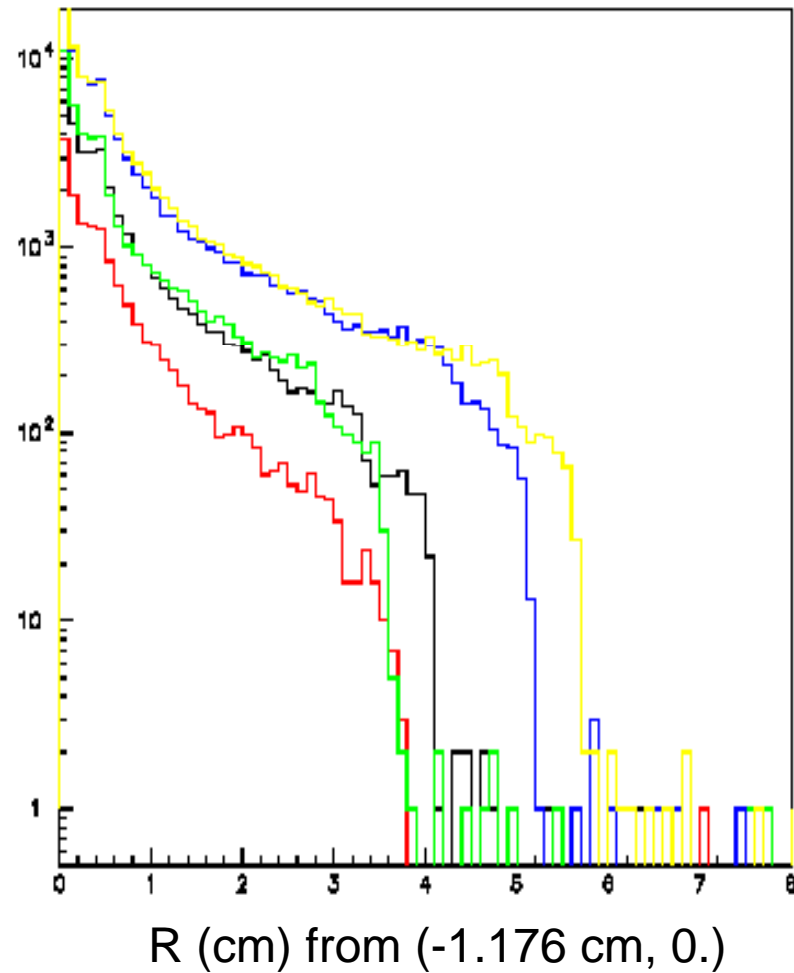
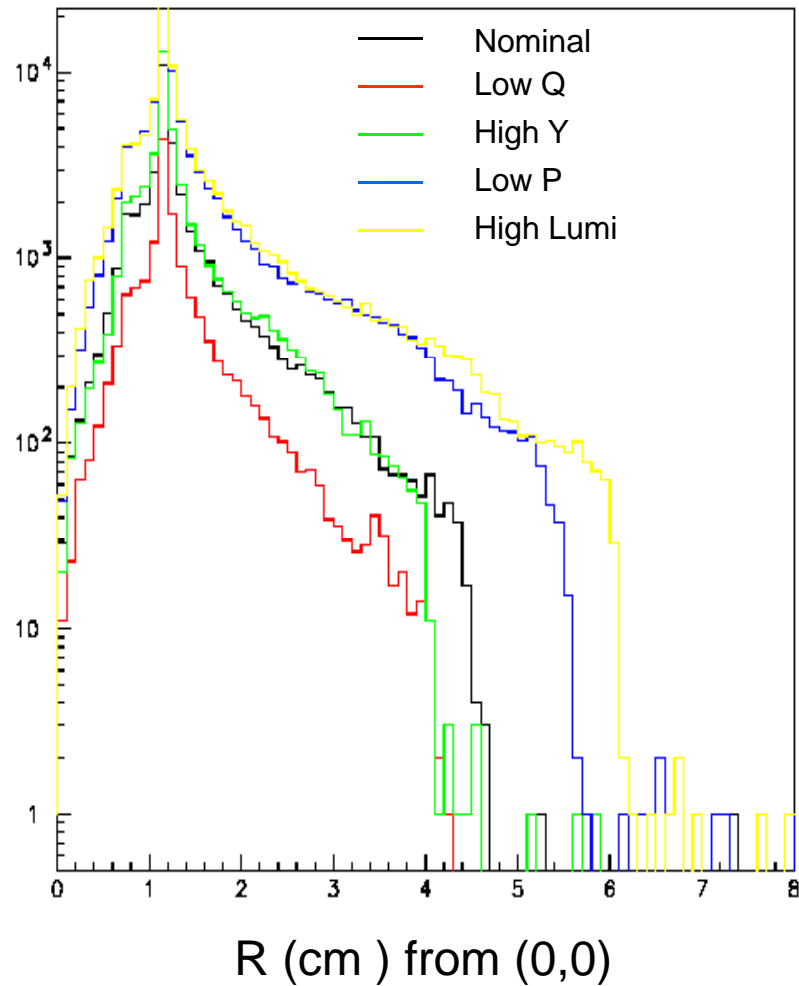
ILC 500 GeV Nominal beam parameters + 5 Tesla



Pair Radius at $Z = 168$ cm

ILC 500 GeV

5 Tesla + Anti-DID



Pair Radius in cm at Z=168 cm

	4 Tesla			5 Tesla		
	ANTI-DID	NO DID	DID	ANTI-DID	NO DID	DID
Nominal	5.2 / 4.7	5.1 / 5.5	5.8 / 6.5	4.7 / 4.1	4.4 / 5.1	5.3 / 6.1
Low Q	4.7 / 4.2	4.4 / 5.1	5.3 / 6.0	4.2 / 3.8	3.8 / 4.6	4.8 / 5.6
High Y	4.6 / 4.2	4.6 / 5.1	5.5 / 6.0	4.3 / 3.9	4.1 / 4.6	4.9 / 5.7
Low P	6.3 / 6.0	6.2 / 6.8	6.8 / 7.6	5.7 / 5.3	5.5 / 6.1	6.4 / 7.0
High Lumi	7.0 / 6.6	6.8 / 7.3	7.4 / 8.2	6.2 / 5.9	6.1 / 6.7	6.7 / 7.5

Radius in black is measured from solenoid axis (x,y) = (0., 0.).

Radius in red is measured from extraction line (x,y) = (-1.176 cm, 0.)

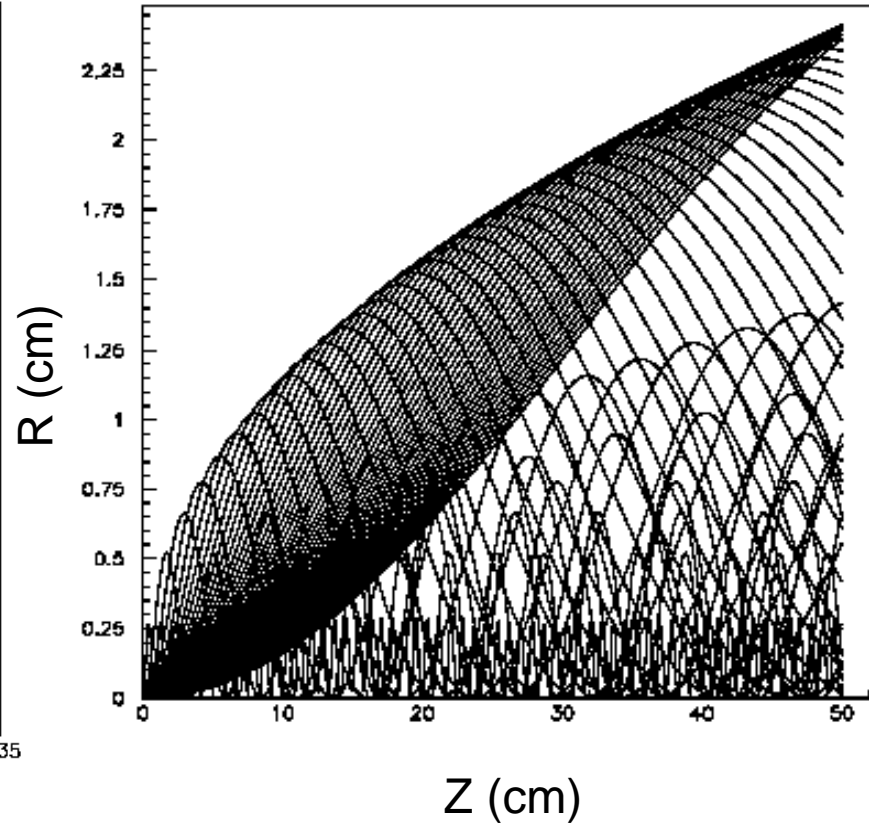
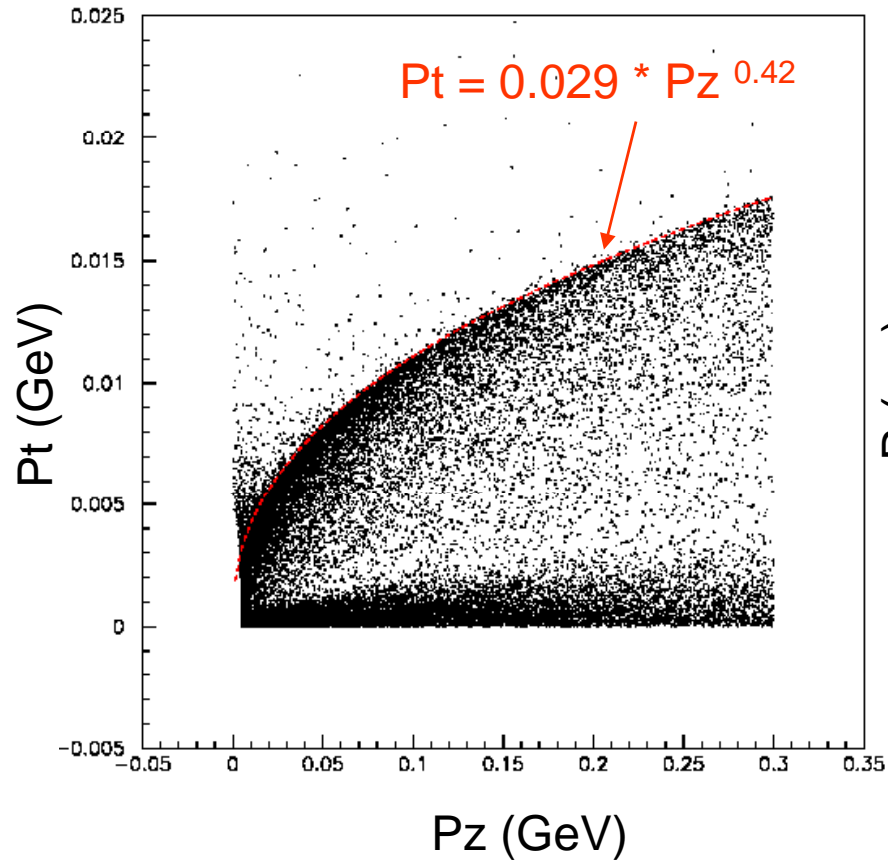
LUMON acceptance

- Inner radius of LUMON can be smaller.
 - Nominal + 5 Tesla: 8.1 cm → 5.0 cm (30 mrad)
 - 4 Tesla → +3 mrad
 - Low P → +6 mrad
 - High Lumi → +9 mrad
- Centering LUMON on the extraction line has an advantage only when ANTI-DID is used.

Finding the pair edge

ILC 500 GeV Nominal Beam Parameters

5 Tesla + 14 mrad NO DID

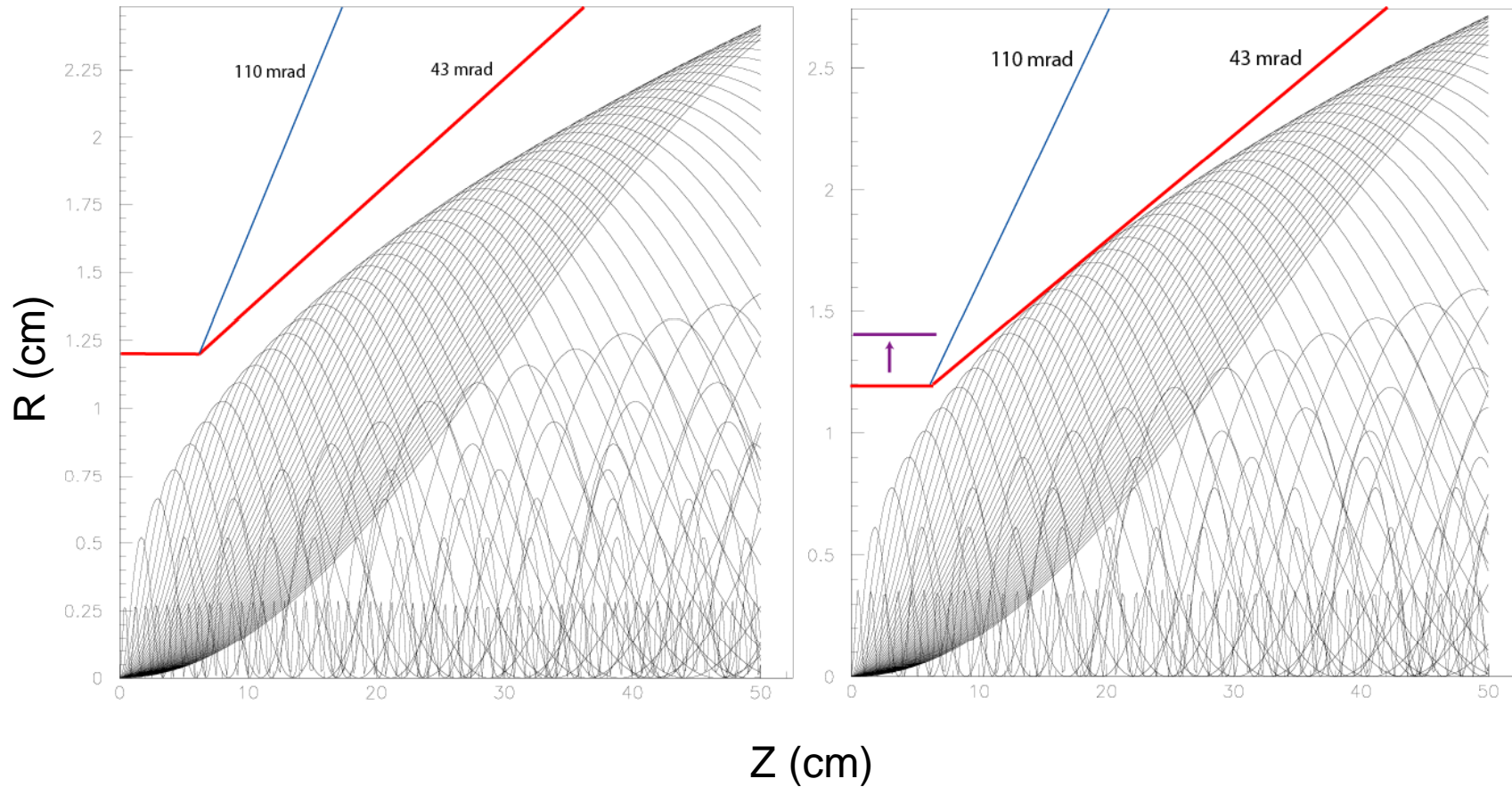


Current Beam pipe is designed for

ILC 500 GeV Nominal + 5 Tesla

5 Tesla

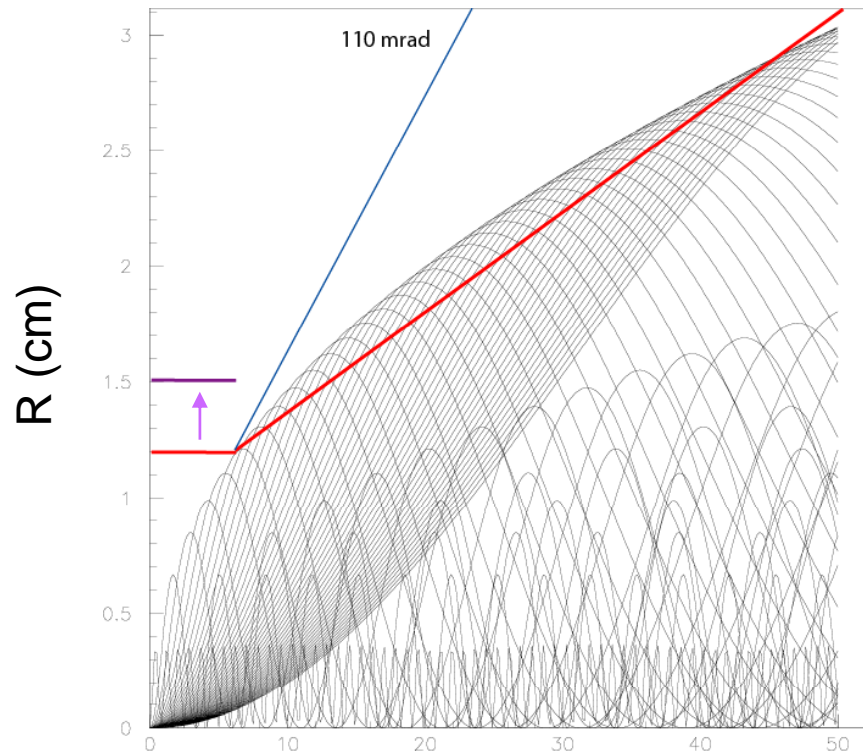
4 Tesla



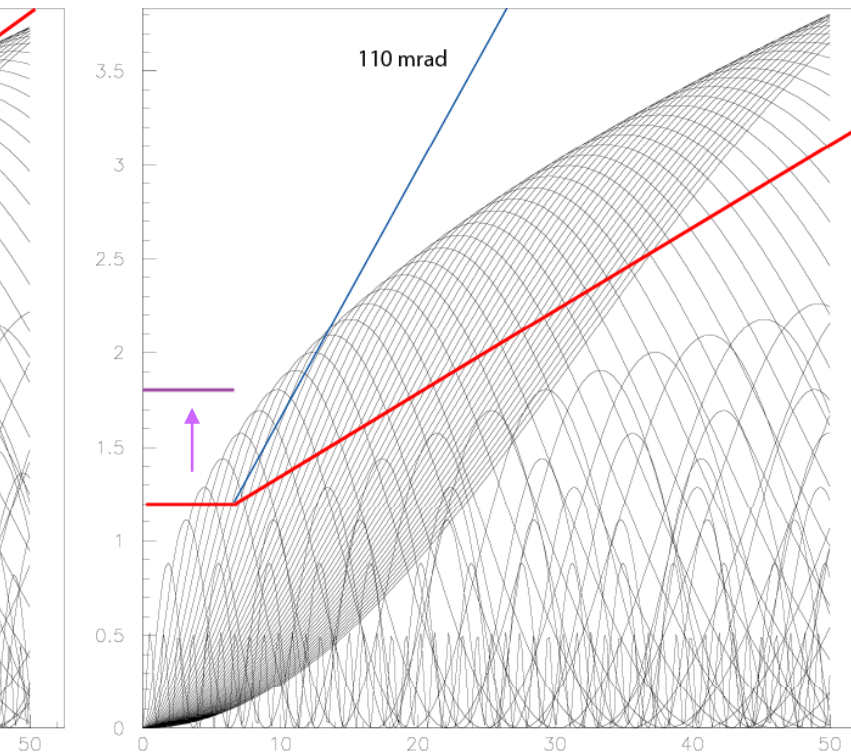
For 4 Tesla, $R=1.2$ cm is tight and 43 mrad is too small.
 $R=1.4$ cm and 110 mrad beam-pipe would work.

Current Beam pipe is not compatible with the Low P or High Lumi options.

500 GeV Low P + 5 Tesla



500 GeV High Lum + 5 Tesla



Z (cm)

110 mrad beam-pipe would work as long as
 $R = 1.2 \text{ cm} \rightarrow 1.5 \text{ cm}$ (Low P), and $R = 1.2 \text{ cm} \rightarrow 1.8 \text{ cm}$ (High Lumi).

Possible geometry

